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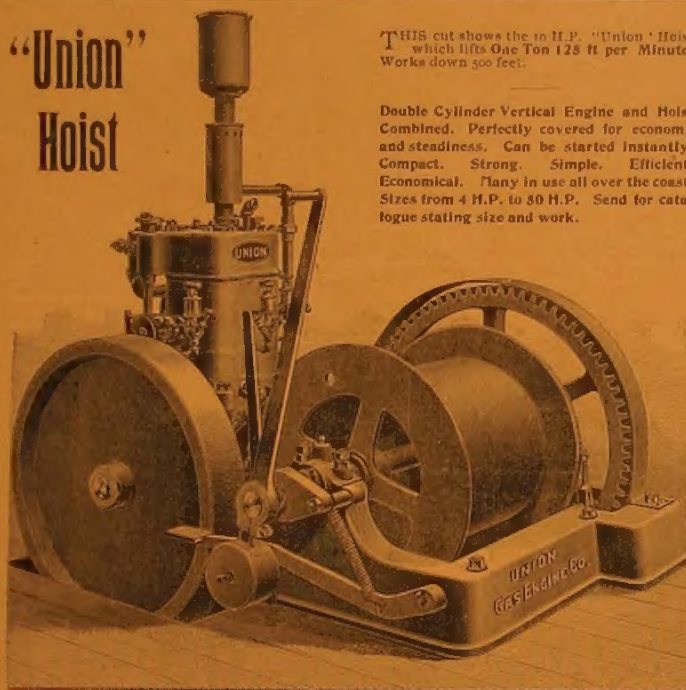
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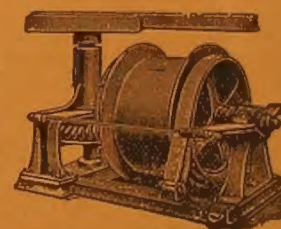
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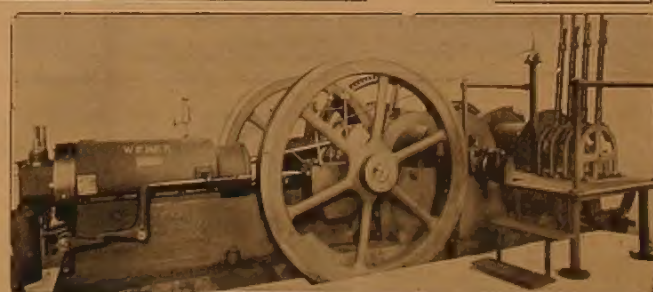
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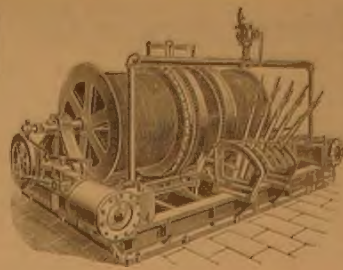


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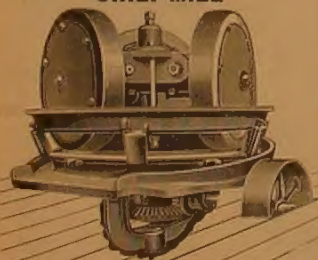
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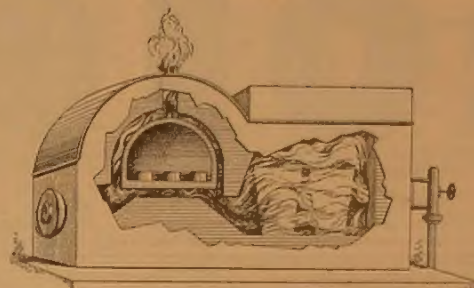
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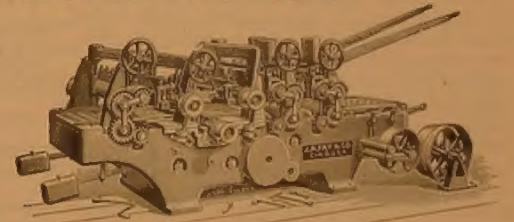
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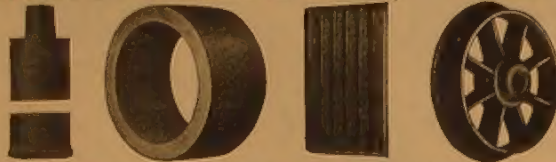
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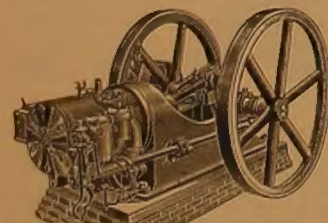
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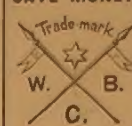
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## PROPOSED SILVER LEGISLATION

The silver producing districts of the west are much interested in anything that pertains to the oft-repeated promises of the politicians at election times that "something would be done to aid an important silver industry." A mere shadow of hope passes over the wide sea of uncertainty through the presentation by United States Senator Pettigrew of Senate Bill, No. 5110, entitled: A bill to provide for the coinage of the American product of silver, and to increase and extend our import trade with all silver-using countries. Section 1 in part says:—"On and after the passage of this Act, any citizen of the United States, or any corporation doing business under the laws of any State, or Territory of the United States, may deposit at any of the several mints of the United States, not less than 50 ounces, troy weight, nor less than 900 fine of any silver bullion, actually mined and produced in any State or Territory of the United States, and receive therefor for every 371½ grains, troy weight, of pure silver, one silver dollar of the weight of 412½ grains, troy weight, of standard silver, as provided in the Act of January 18, 1837, or at the option of any such citizen, or such corporation depositing any silver bullion mined and produced any State or Territory of the United States, at any of the several mints, as herein provided. The depositor may receive in lieu of such silver dollars, silver certificates for a similar amount. The silver deposited to be held for redemption of silver certificates, both being legal tender for all debts, public and private. Sec. 2 provides that silver certificates shall only be issued to equal the amount of silver bullion or coin on deposit. Sec. 3. Foreign silver, from a free coinage of silver country, received in payment for any product of America, must pay one-half of one per cent duty per troy ounce of pure silver, before it can be coined into

U. S. silver coin or receive silver certificates for a like amount. Sec. 4 imposes a duty on all other silver bullion or coin imported into the United States, or any Territory of the United States, of sixty-five cents for each troy ounce of pure silver. Any violations of the provisions of this Act shall be punished by imprisonment for one year, or by a fine of one dollar and twenty-five cents for each troy ounce of silver imported in violation of this Act, or by both such imprisonment and fine. Sec. 5. That whenever any obligation of the United States, excepting the silver certificates issued and provided for under this Act, shall be presented for payment or redemption, the Secretary of the Treasury shall pay or redeem such obligations in gold and silver both, according to the relative amounts of each in the treasury on the day of presentation, but all United States notes now outstanding and so redeemed, shall be reissued, and if any of the silver certificates issued under the provisions of this Act be held in the Treasury, they shall be counted as silver coin in estimating the relative amounts of gold and silver in the Treasury, and may be issued in lieu of silver coin. Sec. 6 says that when there is not sufficient gold and silver in the treasury, bonds may be issued of the denomination of fifty dollars, and the multiple of fifty dollars, to meet the obligations of the government.

Our ever increasing demand for more silver coin for home use, together with the extra necessity at present for a large supply of United States silver coin for the colonial possessions, acquired as a result of the late war with Spain, make the increased coinage of silver under the Act a pressing necessity. The premium offered to free silver coinage countries is a move which will tend to increase our foreign trade in machinery and manufactured goods from the United States, and would divert that trade from Germany and Great Britain.

Politically, this Act would have the effect of taking the silver question out of debate, if the gold faction in the House will look far enough ahead, to make a wise move for present and future requirements of the country, and settle the question for the benefit of home industry, foreign trade and strength to the party now in power.

## A SALT LAKE RAILROAD.

Los Angeles will have another railroad. The Utah and Pacific railroad has purchased the depot site. This fact is verified by those who are in possession of the facts.

The entire deal includes about 182 acres, and comprises the following lands: G. W. Frink, 10 acres; Russell, Plater & Black, 23 acres; Workman & Burke, 11 acres; A. Jacoby, 27 acres; J. Regan, 25 acres; W. H. Workman, 60 acres, and Mrs. Hollenbeck, 30 acres. These lands extend from First to Seventh streets, and from the Los Angeles river to the bluffs.

The money involved approaches \$300,000. This is less than \$1,500 an acre, and is in great contrast to the \$6,000 an acre the Santa Fe paid several years ago for similar lands, and the \$65,000 the Southern Pacific paid for eighty-one acres on Alameda street several months since. It is safe to say that lands in Los Angeles will never be purchased at so low a figure again.

These lands are to be used not only as a depot site for the Utah and Pacific, and other roads that will be built into Los Angeles, but also for railroad yards, switches, car houses

and warehouses with platforms with quick unloading.

Another branch of the operation of the syndicate handling the deal involves the bonding of the O. T. Johnson hotel site, between Ninth and Tenth street and Los Angeles and Main streets. This bond is for \$160,000 and matures in ninety days.

This hotel property is to be used for an up-town depot. The property, according to the promoters will be reached by the construction of a raised railroad track, which will skirt the river for a distance and then run up Tenth street.

The old rumor that the Terminal road will be the western outlet for this new railroad is revived.

The outcome of these negotiations is awaited with much interest. The whole matter demonstrates that the construction of the San Pedro harbor is stimulating the railroad corporations of the country that are anxious to secure a foothold in Los Angeles, Cal.

## THE MONETARY SITUATION.

As should have been expected, the Secretary of the Treasury and the Bankers' Alliance seem to have given up all idea of making an effort for monetary legislation during the present session of Congress. There is no time which can be devoted to that subject and there is apparently an indisposition to take it up under the present condition of public affairs. No doubt this is excessively annoying to Secretary Gage and the Bankers' Alliance.

The government has proceeded far enough in the commercial and fiscal affairs of Cuba and Porto Rico to have discovered that their wants are likely to materially modify the policy that should be adopted, and the condition will be further modified when the Philippines are fully in hand and opened to commerce and industrial development. It will take some time to fully disclose what those countries will need, and their needs will considerably affect those of our states and territories on this continent.

There is another matter which is having no inconsiderable influence. During the last eighteen months the balance of trade has been immensely in our favor, and yet but a small part of it has been paid in gold; or, in other words, the amount of gold which has been imported is disappointing, and hence there is not so much confidence as was expected that we would accumulate a sufficiency of gold to enable us to float as large a volume of paper money as the wants of the country require. The reason for the disappointment to the general public is that so many of our securities are held abroad that interest on them absorbs a large amount of the balance of trade. Some of it also has been employed in extinguishing the principal of those securities.

Another important fact is that an immense amount of English capital is invested in this country, which has been earning dividends and profits, and quite an amount of our nominal exports are of British productions in this country, the pay for which is retained in England and Scotland by the investors residing there. The dividends and profits of course are remitted to the investors.

Though for the last two years the actual balance of trade has been against the United Kingdom, still she has suffered no loss of gold, for income on investments all over the world by the British people is always im-



mense and the earnings of her merchantmen have been large, as English shipping carries more than the ships of all other nations. Our outlay to foreigners for transporting for us on the sea is put down at \$100,000,000 annually, which is paid in gold or its equivalent.

So far as foreign trade is concerned for the present we are in easy circumstances, except in regard to ocean transportation. The prospective balance of trade in our favor in future will enable us to meet all gold obligations to foreign peoples, but it is not at all probable that we can accumulate and retain gold coin in sufficient quantity to redeem the volume of paper that will be needed in our domestic trade. As soon as there is suspicion of inability to exchange it for metal money, paper will be discredited, especially the notes of banks, which have no security except the bank assets, a system urged by Secretary Gage and the Bankers' Alliance. The situation is hardly clear enough for present dealing with the money question by the passage of a law establishing a permanent system.

The Mexico Mine and Smelter Supply Co., of the City of Mexico, is the latest organization for supplying the mines in Mexico with machinery. The officers of the company are all old machinery dealers, and know what possibilities there are ahead of them. They are H. R. Ayres, of Denver, Colo., president; Eben Smith, of Denver, vice-president; Frank L. Smith, treasurer; John S. Cary, secretary, and Wm. M. Bushnell, general manager.

They propose to carry all kinds and classes of machinery in stock and furnish nothing but the best, and expect in a short time to have the largest machinery and supply house given to the mining and smelting trade in the Republic of Mexico.

The company is practically the same as the Mine and Smelter Supply Co., of Denver, Colo., as the Board of Directors of both companies are the same.

#### CHEMISTRY IN IRON FOUNDRIES.

The success with which exact chemical methods have been followed in the analysis and chemical tests of all raw material entering into the manufacture of pig iron and of the pig iron manufactured therefrom by all iron manufacturers during the last decade has had its good effect in a similar manner in larger iron foundries. The time has passed when guess work and rule of thumb methods can any longer be depended on in making iron castings for special purposes. Recognizing this necessity and to obviate the trouble and expense to small foundries of obtaining their own analysis and testing, the American Foundrymen's Association in session at Cincinnati on June 8th last, endorsed the project to establish a national agency for standardized iron drillings, on the plan suggested by Thos. D. West in his paper on "The Need of Greater Uniformity in Pig Iron Analysis" read at the April meeting of the Pittsburgh Foundrymen's Association, who appointed a committee to take action in the matter.

#### COMMITTEE'S PROGRESS REPORT.

The committee appointed by the American Foundrymen's Association to establish and advance a National Bureau for the distribution of uniform standardized drillings is now able to distribute a range of samples that it felt will meet the hearty approval and endorsement of managers and chemists em-

ployed directly or indirectly in all branches of the iron industry, pertaining to the making or use of pig iron.

The standardized samples now ready for distribution cover the following determinations:

Silicon, one each of a low, medium and high range of cast iron.

Sulphur, one each of a low, medium and high range of cast iron.

Manganese, one each of a low, medium and high range of cast iron.

Phosphorus, one each of a low, medium and high range of cast iron.

Total carbon, one determination.

Graphite, one determination.

Titanium, three determinations.

In all, 17 determinations made on four (4) samples.

The samples are designated as A, B, C and D. Sample A, which has been ground to pass through a 40-mesh sieve, gives one total carbon and one graphite. Sample B gives a low silicon, a medium sulphur, a low manganese, a phosphorus which is within the Bessemer limit, and a titanium. This has been passed through a 20 mesh sieve. Sample C gives a medium silicon, high sulphur, medium manganese, medium phosphorus and a titanium. This has also passed a 20 mesh sieve. Sample D gives a high silicon, low sulphur, high phosphorus and a titanium, and has passed through a 40-mesh sieve.

The drillings were obtained from castings made after the plan described by Mr. West in his paper before the Pittsburgh Foundrymen's Association, June, 1898, widely published by the trade papers. The drillings were prepared under the supervision of Prof. C. H. Benjamin, and the standardizing under that of Prof. A. W. Smith, both of the Case School of Applied Science, Cleveland. The chemists engaged in standardizing the four samples are Messrs. Booth, Garrett & Blair, Philadelphia; Prof. A. W. Smith, and Cremer & Bicknell, Cleveland, O., and Andrew S. McCreath, Harrisburg, Pa.

The standards are sold at the price of \$5.00 per pound, and in no instance will less than one pound be sold. The samples are packed in bottles, holding one-third of a pound and delivered in cases holding three or four bottles, according to the desires of a subscriber. One bottle each of samples A, B, C and D can be had, or a subscriber can have three or four bottles of all one sample (excepting the sample A, which contains the total carbon and graphite, and of which only one bottle will go to any one subscriber); or two or three bottles of one sample and one of another; in fact, bottles of samples B, C and D can be sent in any proportion desired, as it is the wish of the committee to follow the desires of all purchasers, as far as it is in their power. One pound of the samples should furnish enough material for 36 complete analyses, or at least 200 separate determinations. The analyses of the samples A, B, C and D will be sent separately by mail, so that they can be placed upon bottles or kept private, as desired by the subscriber.

The amount asked for these standards, considering their cost, is very low, and the drillings such that no chemist could manufacture them for himself at many times the price. The outlay for preparing the four samples was somewhat over \$400.00. Moreover, the good that subscribers can accomplish in assisting to promote greater uniformity in the work of laboratories, which have to deal with cast iron, is such that no matter to what part of the country any portion of the sample may be

sent, like reports of analyses can be expected at the hands of careful chemists, who are only too often compelled to resort to short-cut methods in order to keep up with the work of their laboratories.

The undersigned committee is encouraged by the receipt of subscriptions, which include, to date, about thirty-five (35) of our leading laboratories. It is hoped that this open letter will be so fruitful of results that another year will find few, if any, laboratories not possessing the standards herein advanced. Those wishing to assist this movement to the extent of ordering standardized samples, will please address their orders to any member of the following committee:

T. D. WEST, Chairman, Sharpsville, Pa.

DR. R. MOLDENKE,

48th St. & A. V. Ry., Pittsburg, Pa.

JAMES SCOTT,

Lucy Furnace, Pittsburg, Pa.

P. W. GATES,

Gates Iron Works, Chicago, Ill.

E. H. PUTNAM,

"The Foundry," Detroit, Mich.

#### A Compendium of Gold Metallurgy.

The above is the title of a work published by E. M. and M. L. Wade of the well-known assaying firm of Wade & Wade, 115½ N. Main street, Los Angeles, Cal. The book is offered to the mining public, especially to those, unhappily too numerous, who possess little or no knowledge of metallurgy. It is not intended as a text book or for the making of experts, but to give a general idea of the scope and application of metallurgical processes used in extracting gold from its ores.

Chapter 1. treats of the important properties of gold, mercury, sulphurets, tellurides, quartz and silicates.

Chapter 2 gives an outline of processes and operations, also tells a few causes of the failures in working ores, while chapter 3 is devoted to the crushing and pulverizing of ores, the machinery employed, etc.

Chapter 4 contains a treatise on free milling ores, and the operation of reducing them, the mechanism in detail of the different mills used. In describing the stamp mill the following parts are observed: The mortar, stamp, the lifting mechanism, the screens and plates, being followed by a few remarks on making the clean-up, retorting and melting, and the dressing of plates. Roller quartz mills receive the attention of the authors. Automatic feeders are rightly advocated, as they produce a greater output and make a saving on the wear and tear of the mill.

Milling and concentrating tests are dilated upon.

In chapter 5 concentration is treated in detail, while chapter 6 contains an exhaustive description of the different cyanide processes of commercial importance in the following order:

1. MacArthur-Forrest.
2. Keith electro cyanide.
3. Porter electro cyanide, chloration, etc.
4. Pelatan-Cleyici electro cyanide.
5. Siemens-Halske electro-cyanide.

Chapter 7 is devoted to the chlorination of ores, embracing the Plattner process, the hypo-sulphite and Russell processes, including roasting.

Smelting is reviewed in chapter 8, and a paragraph on custom smelting is added.

The book contains 128 pages and cover, is well patronized by the advertisers catering to the miners' trade, and forms a valuable adjunct to anyone's library.







allowed to slowly percolate up to the surface, and to stand sometimes, (especially with material clayey or very fine or lumpy) in order to prevent the formation of channels, and saturate the mass. A very strong stock solution is kept on hand, from which to make up the working solutions, instead of dissolving the salt directly.

Acid ores should be given a preliminary wash with water or alkali solution, or both, the one following the other. Sometimes it suffices to put the solid alkali (lime) into the material omitting the preliminary wash.

#### DISCHARGING.

The leached material is usually discharged by shoveling over the sides into cars, or sometimes through bottom discharge doors. Where water is plentiful, sluicing out is practiced to advantage.

#### THE CLEANUP.

This is done once or twice a month, or oftener if necessary or desired. The zinc is washed free of cyanide, rubbed and washed on a wire screen over a tank of water, and the residue of zinc, still retaining considerable gold, put back into the extractor boxes. The gold slimes in the boxes are then cleaned out, added to those washed from the zinc, and the whole freed from excess of water and treated in one of three ways:

1. Dried, sampled for assay, boxed and shipped to a smelter.
2. Dried, calcined and roasted with nitre to get rid of zinc, et al., or litharge, borax and other fluxes, melted and cast into a bar; or:
3. Treated with sulphuric or muriatic acid to remove zinc, washed, dried, melted with fluxes, etc. Vats with filter bottoms and vacuum arrangements are sometimes used for this operation, but, when time is no object, settling and decantation, or siphoning and draining in a canvas sack works well.

Breathing the fumes given off is dangerous, so hoods with draft flues should be provided to take them away.

#### DEGREE OF PULVERIZING.

This varies greatly, from that of very fine dust to that of walnuts. Usually No. 30 mesh gives good results. The rule is, fine pulverizing for hard, compact, and coarse crushing for soft or porous ores. The "size of pulverizing," or the number of screen, means nothing in themselves, unless other conditions and the relative size of the various particles of the material are considered.

Rolls, stamps, ball pulverizers, etc., are all in use for the dry pulverizing of ore, but rolls seem to be the more satisfactory, being generally considered to give a more uniform product, and creating less dust.

#### LABORATORY TESTS.

Laboratory tests for adaptability to treatment is no simple assay, as many think, but generally should consist of the most, if not all, of the following tests, viz., for:—

1. Acidity of the material and effect of alkali in reducing consumption of cyanide.
2. Strength of cyanide best suited, and consumption of same.
3. Time required.
4. Size of crushing suitable.
5. Depth of percolation permissible.
6. Assays of head, tailing, and intermediate samples of pulp and solutions, taken daily or oftener, for gold, sometimes for silver also, and for cyanide strength.
7. A chemical analysis, either partial or complete, of the ore or working solution, may be necessary or advisable.
8. Zinc orelectric precipitation of the gold

might also be necessary or advisable, as a confirmatory test.

Several days or a week or more may be required for a proper performance of the tests.

## CORRESPONDENCE

### BRITISH COLUMBIA.

ATLIN CITY, B. C., Jan. 17, 1899.

EDITOR JOURNAL:—There is a good deal written and said about this country, and still there is hardly anything known about the possibilities of this section. We are not isolated in an inaccessible place like Klondike, as the trail to Lake Bennett is kept open all winter. This place is all hustle, and the town is rapidly assuming the appearance of a typical mining camp. A great number of business houses are being erected. There is, however, a shortage of building material, which retards the work somewhat. There are two sawmills here running day and night, and still they are unable to supply the ever-increasing demand.

It is too cold and the weather is too severe to admit of much prospecting, but we have secured enough gold to demonstrate to us that this section of the country is all right. Two new creeks were discovered, besides McKee creek, which was reported some time ago, and the miners wintering along them think a great deal of their gold resources. Numerous claims have been located on Moose and Sheep creeks. Moose creek is twenty-five miles below here and flows into Atlin lake. Sheep creek empties into the end of Taku Arm. New streams are continually being found, and pay dirt secured from all. This section will hardly be recognized by former locators when the next mining season commences.

There are ten or twelve inches of snow on the ground at the present time hereabouts, but in the higher places, at the sources of McKee and Spruce creeks, the snow is quite deep—seven or eight feet.

The weather has been very mild and pleasant, but of course the atmosphere is somewhat harsher than one will find it in the spring in Southern California.

I understand the revenues collected by the Canadian government from the American goods which entered the domains of Canada at Log Cabin en route to Atlin is something enormous. Nearly fifty thousand during the month of December. There are ten men on the Atlin boundary and practically none of the goods dutiable escape their vigilance and it is known here that the customs staff on the boundary will be reinforced and five or six more men will probably be put on when the rush of prospectors starts in. There has been considerable difficulty here in regard to locating claims. Numerous prospectors thought they were in the Northwest Territory and staked off 250 feet, whereas they were in British Columbia and entitled to only 100 feet. Next June 1st, when the closed season ends, this matter will be taken up and adjusted. It is probable that the men who staked the claims will be permitted to hold 100 feet of them, and the remainder will be thrown open to others.

The regular closed season here lasts until June 1, and has no effect upon the rights of prospectors. It is a protection for them, as

during that period there can be no interference with the property they have recorded and they are permitted to leave the district to get their supplies or for other purposes.

More anon.

Sou. Cal.

### CALIFORNIA.

#### Great Progress Noted.

Within a radius of ten miles in the central portion of the Slate Range are many rich claims which are being rapidly developed, the foremost being the Dean mine, situated at the base of the mineral belt. This company has employed over twenty men since commencing operations. A ten-stamp mill and cyanide plant is in operation, running twenty-four hours daily, the ore milling from \$60 to \$80 per ton. Water has been developed sufficient to run the mill.

An assay office is now being built which will be a great help to the numerous prospectors here.

About two miles east of the Dean mine is the Merideth, which has been incorporated by the Slate Range Quartz Mining Co. During the past year extensive developments have been in progress, over \$20,000 having been expended in tunneling, road building, developing water and erecting a five stamp mill. The ore is of a high grade, ranging from \$100 to \$300 per ton. Most of the ore has been shipped to the smelter, several carloads having been shipped of this grade. A vein of white honeycomb ore has recently been uncovered which promises rich returns in free gold.

The Royal Flush Mining Co., under the supervision of W. C. Ross, have begun work on the Royal Flush mine in Leighton canon, situated one and a half miles south of Dean's mine. Assays from this mine have ranged from \$49 to \$80 a ton.

Leighton canon opens into a large basin which holds the principal water supply of Slate Range. Water in abundance is found at the depth of eight feet.

Two miles south of the Royal Flush mine is a group of claims with mammoth ledges but ore of low grade, from \$8 to \$50 a ton. There is water on one of these claims sufficient to run a ten-stamp mill. The Mullen Brothers, mining experts from Montana, are interested in these claims, which are being rapidly developed. Either a mill or dry crusher with cyanide plant will be shortly erected.

South of this group are numerous mineral-bearing hills yet undeveloped.

In the Stringer district at the north end of the range the ore assays high but the veins are small.

The Norval mine, in this district is down over 100 feet and they are taking out satisfactory shipping ore.

San Francisco capitalists are erecting an extensive borax plant on Borax Lake about a mile west of the base of the range. This company have sunk a well 125 feet near the base of the mountains and have erected a large windmill to supply fresh water to the refinery. At present they employ from ten to fifteen men, but more will be put to work as soon as the plant is completed and in operation. A general merchandise store has been opened just below the Dean mine by Mojave parties.

A mailing and staging station has been arranged for. The stage will run through Leighton canon, a natural road through the range—stage running from Johannesburg to Ballarat, Panamint range.

C. A. BAILEY.



## JEFFREY T. M. 110 ELECTRIC LOCOMOTIVE

One of the latest locomotives designed and put upon the market by the Jeffrey Manufacturing Company, of Columbus, Ohio, is known as their T. M. 110 electric locomotive, a cut of which is shown on this page. A number of these locomotives have already been put into service and the results obtained by their use have demonstrated the advantages of this form of construction where large quantities of material have to be removed over a considerable length of track.

The first electric locomotives used in connection with mine work were very light; but the manufacturer has been building them heavier and heavier each year, as the work they were called upon to do was increased. Mines where these lighter locomotives were originally installed have advanced farther into the veins and at the same time increased their output, consequently these light locomotives have not only had longer distances over which to travel but the loads behind them have been constantly increased. The locomotive we show in the cut is a distinctively new type and the heaviest and most powerful locomotive for mine and surface haulage which has ever been built and put in successful operation. The weight of the machine is fifteen tons and in getting this weight the most essential feature of such locomotive has not been lost sight of, that is compactness. Not only has this idea been kept closely in mind by the manufacturer, but the other important improvements in electric locomotive design and construction have been conspicuously developed.

The distribution of weight in the design of a locomotive will determine largely the size rail upon which it is necessary to operate it and therefore effect to a large extent the cost of laying track. Few mines in this country are equipped with rails weighing more than 35 lbs. to the yard. If the weight of the locomotive is distributed uniformly on its drivers and the number of drivers is sufficient to insure a comparatively small total weight upon each, then the wear and tear upon the track will be minimized. In all the heavier locomotives built heretofore, it has been the custom to use four drivers, but in the T. M. 110 Jeffrey electric locomotive three sets of wheels and axles are used, making six drivers in all, upon which is distributed the weight of the locomotive, thus each driver is called upon to carry only  $\frac{1}{6}$  of the weight instead of  $\frac{1}{4}$  as would be the case in the common design of a four driver electric locomotive. The frame of the locomotive is mounted on equalizing springs arranged on the four point suspension system. The method of spring suspension allows adjustment of the wheels to the irregularities in the track. By this arrangement a proportionate amount of the weight is at all times distributed upon each driver and consequently you obtain the maximum tractive force continuously. Not only is this advantage gained by such mount-

ing of the frame but by thus distributing the weight less wear and tear is occasioned upon the track and lighter rails can be used. The vibrating or pounding effect upon the track is entirely overcome. All of the points are most essential as they determine very largely the cost of installation and operation of an electric haulage plant. On account of the middle axle being fitted with smooth faced drivers instead of flanged wheels it is possible to operate this form of locomotive on tracks where curves of small radius are frequently encountered. On each one of the three axles is mounted a motor of proper size and capacity and by thus distributing the power among three motors it is possible to build a locomotive for a much narrower gauge without sacrificing either efficiency or simplicity.

It would be very simple to build powerful motors for electric locomotives if such locomotives were operated on standard gauges of surface roads. The frame is of the best gray iron casting securely fitted and bolted together with turned bolts and reamed holes.

The wheels are of the best chilled gray iron, this form of wheel having been found more serviceable and economical for electric local motives in mine use, than the earlier type of tired wheels. These wheels are mounted on axles of hammered steel accurately turned.

strength that the drivers can be slipped, if necessary.

The top of the locomotive is covered, over its entire surface, save the operator's so that water dripping from the mine roof, falls of slate, and other foreign substances are not permitted to fall into the working parts. This whole top is so hinged that it can be easily removed when it is necessary to gain access to any of the motors gears or other parts of the machine. There are only three pinions and three split gears on the machine. The pinions being keyed to the armature shaft, the split gears being keyed to the axles so that there is no power or energy lost in consequence of intricate gearing. The construction of the locomotive as a whole is of the utmost simplicity, consisting as it does of the wheels axles, frame, three motors, and controller; each part being readily accessible without the removal of any of the other parts.

The Jeffrey Manufacturing Company build electric locomotives of all sizes and for all purposes, their locomotives being in use in every industrial line. They have recently gotten out a very handsome catalogue in which they show cuts and descriptions of their locomotives, which catalogue will be very helpful to any one interested in the economical handling of material about mines of all kinds, smelters, manufacturing plants, coal yards, etc. Such catalogue will be mailed to any address upon application to The Jeffrey Manufacturing Co., Columbus, Ohio, U. S. A.



JEFFREY T. M. 110 ELECTRIC LOCOMOTIVE.

The motors are of the multipolar, ironclad type completely enclosed and fully protected by the motor casing. They are waterproof and of a type admirably adapted for this class of work.

The controlling mechanism is one of the features of superiority in the Jeffrey locomotive, the number of steps in the controller being sufficient to admit of the starting of a loaded train at a uniform acceleration without jerking. In connection with the controller is a series-parallel switch, which will admit of the motors being run either in series or parallel according to the speed at which it is desired to move the load. All these parts together with a reversing switch and sand box levers are conveniently located so the operator can handle them without difficulty. The operator's seat is located in the center of the car between the axles where he is fully protected from injury in case of accident. The trolley pool can be located on either side of the frame of the locomotive. The sand boxes are cast in the frame and the supply of sand can be regulated by a positive motion operated by levers. The brake is of the automatically locking equalizing screw type of such

The Tuolumne Independent of January 7th, publishes a full account of the horrible disaster at the Jumper mine, in which four men met death by the falling of a skip from the 600 foot level to the bottom of the 775 foot shaft, caused by an act of carelessness or negligence on the part of the engineer. Together with the account of the accident the paper publishes an article by Chas. L. Lang. "The Responsibilities of a Hoisting Engineer and Some Needed Legislation", from which we make the following extracts and heartily endorse them:

"For the safety of our mining public and in the interest of true economy and business success it is essential that none but good engineers be employed in the mines of California. All engineers should be licensed; none but competent men allowed such license. These men should also receive higher wages than is commonly paid in this State. Mines and hoisting works, boilers and machinery should be under the jurisdiction of a State Mining Inspector."

"None but the safest hoisting machinery should be used and made of good material. The old-fashioned clutch engine should be thrown on the scrap heap and its use made a State's prison offense. Twenty per cent. of the hoisting accidents and usually the most fatal ones are caused by the use of the lever-clutch. Friction clutches are now made safe and perfect in action and there is no excuse for using the obsolete dangerous kind."



## THE GARRETSON FURNACE.

The theory of pyritic smelting as elaborated by Hollway was nearly perfect, and gave very great promises, but the carrying out his process has been so unscientifically attempted, with such poorly designed apparatus, that pyritic smelting has been referred to as an "iridescent dream." Yet it is true that there are several pyritic furnaces running, and the ore has been made to smelt itself, rapidly, and cheaply without the addition of carbonaceous fuel. But the matte was low grade, so from an economic standpoint, the results were not satisfactory.

Again, ores have been smelted with carbonaceous fuel, that contained within themselves an abundance of fuel for their own treatment, if the apparatus had been so constructed that all the available fuel contents of the ore could have been utilized. But the apparatus was so constructed that the carbonaceous fuel was first oxidized, the sulphide melted into a low grade, thus entailing the cost of further treatment and robbing the furnace not only of the best part of the fuel originally contained in the ores, but of the iron needed to slag the silica of the charge, where the same carries an excess of silica.

The three operations, roasting, smelting, and converting, carried on in a single furnace, reducing the cost of installing a plant to treat a given amount of ore, and reduce it to the metallic state, costing about one-third of what it would to build roasting appliances, a smelting furnace, and a converter or bessemerizing plant, is what the Garretson Method of Combined Smelting and Converting Sulphide ores has accomplished.

With this furnace, and a hot blast apparatus which recovers the heat from the slag, ores carrying sufficiently high percentages of sulphur, iron, arsenic, etc., can be smelted and converted into copper bottoms or black copper, at one operation, without the continued use of any carbonaceous fuel in the furnace, thus carrying pyritic smelting to perfection.

These improvements combine pyritic smelting, and continuous converting in a water-jacket furnace. The mattes as fast as produced, are reduced in the furnace to metallic copper carrying the precious metals.

The mattes all being converted within the bottom of the furnace, the heats generated in pyritic smelting and in converting, are both made available to smelt the ores; thereby taking a marked step in advance of pyritic smelting alone.

The furnace is so constructed that the mol-

ten matte is constantly flowing into the converting compartment, thus continuously supplying fuel to the charge being converted, thereby enabling the metallurgist to maintain sufficient heat while converting in a water-jacket furnace.

In smelting iron and copper pyrites, gold bearing quartz or other siliceous ore can be charged into the furnace, just as they come from the mines, and all their values recovered, while their silica combines with the oxide of iron to form a fluid slag. That under the bessemer process could be formed only by the destruction of the more expensive converter linings.

In this furnace a portion of the charge may consist of heap roasted ores, so charged as to prevent it from sticking to the walls, and to allow the free escape of the waste gases, thus obviating one of the principal difficulties experienced in running some ores through pyritic furnaces.



GARRETSON FURNACE CAPACITY 250 TONS PER DAY BUILT FOR COMPANIA METALURGICA MEXICANA SAN LUIS POTOSI, MEXICO

The furnace in its simplest form, as designed to treat sulphide ores carrying copper, gold, and silver, is a single stack, water-jacket furnace, long in proportion to its width, arranged for two pressures of blast, the whole being so arranged and operated that copper may be tapped from one end, while more than ordinarily clean slags run continuously from the other end.

When constructed as a lead copper smelter, to treat more complex ores, advantage is taken of the specific gravity and the affinities of the molten products, to separate the copper from the lead, bismuth, etc. The smelting is so conducted that the lead, and bismuth, are first reduced to the metallic state, and settle to the bottom of the furnace and are drawn out without the loss of a large part of them by volatilization as in copper smelting.

The copper and iron having a greater affin-

ity for sulphur and the sulphides being of lower specific gravity, float into another compartment of the bottom to there be converted, the copper to the metallic state, the iron to oxide, and then to a silicate of iron which flows away as a fluid slag, the sulphur flying away as an acid gas.

When constructed as a pyritic smelter, a hot-blast apparatus is added, which extracts, practically, all the heat from the slag, and returns it to the furnace in the blast.

This apparatus makes a great saving in fuel by recovering the heat from the slag, and handles the slag mechanically, discharging it, without hand labor.

In the Garretson Furnace as designed to treat copper and iron sulphide ores carrying the precious metals, the following description will suffice.

The brick off-takes above the floors are supplemented and strengthened by water-cooled side pieces that enclose water-cooled

doors that can be raised, lowered, or removed, when repairing furnace. The smelting blast which should be heated for economic work and especially so for pyritic smelting, enters through a large pipe at one end (which may be lined with non-conductive material) and passes in through the tuyeres above the slag line in the ordinary manner. The bottom of the furnace is made hollow, and the converting blast passed through it more for the purpose of cooling the bottom, than for heating the converting blast which enters the bottom from below and passes to the left, around the manhole under the entire bottom of the furnace. A water jacket dam divides the high-grade matte and copper from the

low grade matte which as fast as produced flows over the dam and is there converted to high-grade matte and then to metallic copper that settles to the bottom and carries precious metals down with it. The slags that are formed in the converting end of the furnace are necessarily rich, too rich to draw off and throw away, but as they flow to the right over the low grade matte, and are bathed in the shower of falling low grade matte, they give up their values to the sulphur, and escape as more than ordinarily clean slags, since they are made to pass through a region where unroasted ores are being smelted low grade matte is being produced. Any of the matte that may be swept out of the furnace with the slag settles to the bottom of the tightly covered settling pot and can be drawn out and returned to the furnace. The blast being trapped, to prevent its escape, the pressure of the







erected at the Ford mine is nearly completed.

Kane & Garnett have bonded the Big Four quartz mine adjoining the Thorp, at Fourth Crossing.

A new shaft is being sunk on the property of the Fort Wayne Gold-Producing Company, which is situated near the County Hospital. The machinery has arrived and is being put in place.

#### RI, DORADO COUNTY.

The Havilah, now known as the Nashville mine, about eight miles from Placerville, is said to have been the first gold-quartz mine operated in California. It was worked by Col. Chilton in 1849, with machinery brought across the Isthmus.

Work in the new tunnel at the Unity mine, Webber Creek district, is being vigorously prosecuted. The tunnel is now in 240 feet. The company expects to strike the ledge within another 100 feet, tapping it at a depth of 250 feet. J. Kiddy, late of Grass Valley, is now superintendent of this property, which is one of the group owned by the Pine Hill Gold and Silver Mining Company of San Francisco.

#### KERN COUNTY.

The Yellow Aster mill is fast approaching completion. All the work now to do, or nearly all, is under cover so that storms or rain will not seriously interfere with the work. The boilers are set, the engines are now being put in place, the batteries and mortars are in and the last of the stamps put in. Every day now adds much to its condition.

The Eureka mill crushed 30 tons for the Wedge Co., a few days ago which went \$100 per ton.

A good strike has been made in the Baltic, located between the G. B. and Gold Coin, and a night shift is to be put on tonight.

The Hard Cash mill is making about a ton of concentrates per day. This means they are crushing about twenty five tons of ore per day. Everything is working very satisfactorily, and the company have bought a new crusher, and expect to double their capacity in a short time. One assay made on the concentrates showed \$243 per ton. At this rate or near it, this is a mighty good proposition.

#### RIVERSIDE COUNTY.

The O. K. mine, at Virginia Dale, is turning out some good ore. From a twenty days' run in their little two-stamp mill, Messrs. Ingersoll & Esler, the principal owners, cleaned up 100 ounces of gold, valued at \$1,700. There is about 800 feet of work done on the mine; a shaft, 180 feet deep, and the rest in drifts, all in good paying ore. With this amount of work done, one can hardly say the mine is developed. There are only six men employed by the O. K. Company, three in the mine and three at the mill.

Jos. Arbois, of Virginia Dale, has a good mine in the Leon. He is now working a gang of men developing and extracting the ore.

The Brooklyn, owned by H. B. Botsford, is another first class property. Ore from this mine is being milled at the Reitz & Sherman mill with great success.

Ferguson's mill is handling the ore of the celebrated White Star mine, while Meacham's mill is working the ore produced by the Noble Grand mine.

John G. Burt, one of Virginia Dale's old timers, has a force of men at work on his properties prosecuting development work. Mr. Burt has some first-class mines.

#### SAN BERNARDINO COUNTY.

J. L. Campbell filed a big water location for record, says the San Bernardino *Free Press*. The claim is located in middle fork, Lytle Creek, and appropriates 1,000 inches therein, and is to be used for generating electricity and mining machinery, for the compressing of air to be used in transmitters. The location was made Jan 5, 1899.

#### TUOLUMNE COUNTY.

The Arbona and Gagnere mines have resumed operations with large forces.

Bob Dull and partner have struck a good prospect in their pocket claim on Jackass hill.

The work of pumping out the Bonanza shaft was begun recently.

The Street & Cross mine, near Tuttletown, was started up this week. Miners are engaged in straightening out the shaft, which is down over 100 feet, and when this is accomplished sinking will be resumed. A new road is also being constructed to the property.

The Black Oak mine is running steadily under steam. In the mine proper, work for the present is being confined to driving ahead and stopping from the 800-foot level north.

The Columbia Gravel and Exploration Company was forced to discontinue the original boring at a depth of 220 feet, owing to the chipping of the hole's rim, after which the pipe could be driven no deeper. Forty feet of pay gravel had been passed, though bed-rock was never reached. A new boring was started and is now down over sixty feet. —*Union Democrat*.

### COLORADO.

The Matoa Gold Mining Company won its suit against the Cripple Creek tunnel before Judge Hallet. The judgment resulted in favor of the Matoa Company in the sum of \$30,000, for ore extracted from the Gold Pass claim of the Matoa Company.

N. B. Bailey, president of the Eldora Bank and also of the chlorination works at that place, states that the outlook for Eldora was never better than at this time. In fact, it is beyond his expectations. He states that the new \$75,000 mill will be running the first of February, and will be the most improved in the West. In fact, it will be as complete as money can make it. One of the improvements will be that everything will be crowded into less space than is usually allowed for such a plant. The ore, after being heated, will not have to be carried so far for cooling, thus making a nice item of saving. A new scheme will be tried in settling the dust which contains particles of gold. This dust will be gathered into bricks and sent to the smelter. This is an important item of saving, as is shown by the fact that the Colorado-Philadelphia Reduction works have 150,000 bricks on hand at this time, which can be sent to the smelter at any time.

#### Vindicator Election.

At the annual meeting, at Denver, of the Vindicator Gold Mining Company, the following officers and directors were elected: President, F. L. Sigel; vice-president, G. S. Wood; secretary and manager, F. A. Campbell; treasurer, Adolph J. Zang. These gentlemen compose the board of directors. Outside of the election of officers little business of importance was transacted.

The main workings of the Pharmacist mine steamed up on the 11th inst. For several days yet operations on this part of the prop-

erty will be confined almost entirely to cleaning up the mine. When work is begun in earnest, the first move of the lessees will be to sink the Jones shaft about twenty feet, and connect it with the eighth level of the old workings of the mine. This will be at 560 feet depth. A three-shift force is employed. J. S. Murphy, who made a mine out of the Isabella Company's Smuggler, is a part owner in the new lease in the Pharmacist and is in charge of the work. The lease runs 5 years.

#### Cripple Creek Doings.

The New Zealand Mining Company, owner of the Deadwood, Pauper and New Zealand claims, on Bull Hill, besides valuable shares in the Garfield Consolidated and other mining companies of the camp, has been practically absorbed by the Consolidated Gold Mines Company. The latter company, already owner of the Wild Horse, a new shipper on Bull Hill, recently purchased 325,000 shares of the New Zealand Company in one block, this being the controlling interest, and now owns a large proportion of the capital stock. The Consolidated Gold Mines Company has also secured from E. H. Newland the lease on the Deadwood recently purchased by him from Heaton and Cleveland. This lease has been equipped with an electric hoist, the shaft house has been remodeled and a commodious ore house has been erected. The property was connected with the main office at Victor by the private telephone line, which also runs direct to the Wild Horse mine. The Deadwood is being rapidly placed in shape for heavy production, and at the same time is making small shipments. The Pauper and the New Zealand are being worked by lessees. The Wild Horse, the first acquisition of the Consolidated G. M. Company, is shipping about 25 tons daily, and promises with increased development to become one of the heaviest producers of the camp. The New Zealand Company's interest, therefore, may be included in the list of the Woods Investment Company's properties, inasmuch as the latter concern is the largest owner of the Consolidated Gold Mines Company.

### IDAHO.

Geo. Iaker sold a one-fourth interest in the Hottentot recently to D. Stussi of Rossland, B. C.

John Rankin has sold his interest in the Brucklin claim at the Hump. Total consideration is not known, but there was a large cash payment.

At least thirty transfers of mining property have been made in the last ten days, both in the Hump and upon Rapid river, the majority bringing good money.

Ed Heitsman refused an offer of \$25,000 for the Winslow the past week. He is confident he has a mine and wants to do more development work before he parts with it.

Wm. Swanson, superintendent of the Iron Crown mine of Newsome creek, says the property is producing good pay. The ore that was being crushed when Mr. Swanson left the mill yielded \$100 per ton. The Iron Crown is now a dividend payer. The estimated net returns for December are \$10,000.—*Florence Miner*.

### KANSAS.

#### Galena Notes.

Smith & Co. are building a new mill on their lots on the Mastin ground. Green Beasley, who is operating a 20-acre



lease of the Bloomington land north of the cemetery, was over last week to see how operations were progressing on the ground.

The frame work for the new mill on the lease of the Meredith Bros. was completed this week, and the work of construction will be pushed as fast as possible from now on.

The Webb City Iron Works are also putting up a 75-ton mill for Warren Bros. on their lease on the Mastin ground, but it will probably be six weeks before the mill is completed and ready to run.

James Luke & Co., who bought the Ladies' lease, are rebuilding the old Hedges Bros. plant.

## MINNESOTA.

At the annual meeting of the stockholders of the Alice A. mine, held in the Keystone block, Duluth, Minn., J. S. Hillyer was elected president, Dr. Carl Corson treasurer, and Henry C. Clark secretary.

The directors elected for the ensuing year are: J. S. Hillyer, J. M. Gray, George E. Morrison, Dr. Carl Corson, M. A. Murphy, Henry C. Clark and George H. Hillyer.

## MICHIGAN.

It is said the Victoria Mining Company, organized in Boston, has raised \$700,000 in cash, for the purpose of re-opening the Victoria, or Forest mine in Ontonagon county. The Ontonagon Land and Copper Company is organizing in Houghton, with \$600,000 cash, to re-open the Sheldon and Columbia mines located there.

### Ore Rates for '99.

Contracts for carrying ore from Duluth to Lake Erie ports during the season of 1899 were made at Cleveland this week for sixty cents per ton. This is less than was expected by ore men. The big boats account for it.

## MISSOURI.

The Sheldan Mining Co. on the Kohinoor lease of the Empire ground, are building a new one hundred ton mill on their lease of three lots and a fraction. They are drifting at 150 feet on a 25 foot face of rich ore, and will rush the mill to completion as soon as possible. The mill is being built by day labor under the supervision of Tom Tarr. The power will be furnished by a 100 horse power boiler and 60 horse power engine. They will put in a 16 inch crusher, three sets of rolls with five and six cell steam jigs. The company is composed of Frank P. Anderson, S. A. Wright, of Nevada, and John Dermott, of Webb City.

## MONTANA.

### Gilt Edge Company Incorporated.

The articles of incorporation of the Great Northern Mining and Development Company, the operators of the mines and mill at Gilt Edge, have been filed with the county clerk of Fergus county. The company is incorporated under the laws of New Jersey, the capital stock being \$250,000, divided into 2,500 shares of \$100 each. The paid-up capital is \$5,000, subscribed by the following persons in amounts as stated: Walter B. Devereaux, of Glenwood, Col., one share; Cortland Betts, of Morrison, N. J., one share; Albert

R. Ledoux, of Cornwall-on-the-Hudson, N. Y., 496 shares; Albert Mabatt Smoot, of Elizabeth, N. J., one share; Joseph E. E. Bullen, of New York City, one share. The resident agent and manager is E. W. King, the popular engineer, who for months past managed the properties at Gilt Edge.

## NEVADA.

### Comstock Pumps.

In a few days the pumping of the lower levels of the Comstock will begin. The pumps have arrived at the Consolidated California and Virginia mine, and the heavy standpipes for delivering power and carrying off the water have arrived from Pittsburg. The pumps will not take many days to set, as the apparatus is simple and has few working parts. Two pumps have been sent, so a reserve pump will be at hand. Duplicate elevators have also been supplied. The shaft is repaired and the drain boxes connecting the shaft with the Suto tunnel are in place. This flume is forty-four inches high at the shaft and twenty-two inches at the tunnel end, and is 2900 feet in length. Pumping will begin at the 1750 foot level and continue to the 2800 foot level, or 1050 feet below the sill of the Comstock tunnel.

## NEW MEXICO.

John Johnson has about finished his contract on the new Moreno shaft at Elizabethtown. The property belongs to G. A. Rothgeb and associates, of Las Vegas. The owners are so well satisfied with the work already done and the results obtained, that they will continue operations. This property is situated in a good locality, and many predict for it a fine future.

## OREGON.

The dawning of the new year in Granite, Grant county, finds the camp in a very prosperous condition—much more than ever before in its history, says the Baker City *Democrat*. The La Bellevue is working a small crew. Fred Cabell is pushing development on his Onion creek properties. Ike Klopp has a small force on the Ajax and Savage near by. Dr. Russell has 13 men at work on the Canary group, crowding the work night and day. A small force is taking out another shipment of very rich ore from the Cougar. Jerry Seabrook has one man with him on the Campana, at the head of Last Chance gulch. Wm. Robinson is working in the same vicinity. C. S. Miller & Co. are on the Phil. Sheridan group, upper Grauite creek. The Banzette mine, near Robinsonville, under lease to Keeton, Robinson & Co., is drifting on the 75-foot level. The Don Juan and Phoenix mines are both working good crews. The Pyx, under lease to Henry Mounts & Co., has been at last cleared of water and is sending out good ore.

## SOUTH DAKOTA.

### Black Hills Notes.

A change in the formation is reported to have taken place in the Detroit & Deadwood shaft, Two-Bit.

At the American Express, Blacktail district the work of development is steadily proceeding. Six miners are employed.

The Golden Sands, one of the properties

operated by the Horse Shoe Company, is shipping from five to seven cars of ore weekly.

A hoist has been placed in position at the shaft on the Dolcode property, and sinking of the shaft will be done as rapidly as possible.

From among the mining propositions which have paid dividends for the year 1898, the Homestake is credited with \$636,250, and the Holy Terror, \$81,000.

Owing to the freezing of the water supply, the mill at the St. Elmo has been compelled to shut down, and this has caused suspension of operations in the mine.

Since the discovery that wolframite existed in the vicinity of Lead, mine owners and prospectors have been giving the matter considerable attention, and indications are that a valuable industry will be opened up in this vicinity in the near future.—*Black Hills Mining Review*.

## UTAH.

### General Notes.

No action was taken by the Bullion-Beck Co. toward the declaration of a dividend in January, and it is likely that it will be passed. Absence of encouraging news, or, in fact, any news at all, is doubtless the cause of the slow action of the stock.

Centennial-Eureka of Eureka, Utah, is shipping some first-class ore. The regular dividend of \$15,000 was paid on Jan. 16th. The mine is in splendid condition.

The Eagle Co. of Mercur has reported a rich strike of good ore, but as yet, nothing is known in Salt Lake of the real merits of the strike.

Reports from Eureka say the Eagle and Blue Bell properties are in fine ore and a shipment will soon be made. The stock is selling in Salt Lake City at \$2.00 per share.

## WASHINGTON.

Messrs. Grainger, Carter, Sullivan and Ramsey now have the Lily R. claim at Republic. They uncovered a six-foot ledge of quartz carrying a good value in gold. The ore from this mine resembles the rock found in the Republic mine.

A force of miners with hand drills are working on two of the ledges encountered in the Palmer mountain tunnel at Loomis and are opening up some fine ledges of ore.

## FOREIGN MINING NEWS

### LOWER CALIFORNIA.

The La Fortuna Mining Co. of New York have recovered their property located at Agua Dulce, Lower California, from the Mexican government. This property was seized last June by the Mexican officials by reason of the company's manager, Gay Lombard, having clandestinely shipped \$75,000 in gold bullion to avoid the payment of three per cent Mexican export duty.

The government placed a heavy fine upon the company, and seized the property for payment. The company was in no way a party to Lombard's actions, and maintained they should recover the property upon the payment of regular duties and the costs to the government in seizing and holding the property.

After a thorough investigation the Mexican



government made liberal concessions, and the money was deposited with the court awaiting orders from the City of Mexico, and H. A. Howard, who had been appointed manager of the mines, was placed in possession of the property.

The company has a 10-stamp mill in operation, and another 10-stamp mill on the ground ready to be erected.

The first work to be done after overhauling the mill will be to pump the water out of the Tesora mine, which is full to the 50-foot level. Until this is done the stamp mill will be operated with custom work, as there is considerable ore on the dumps at other mines in the district. The company has expended about \$100,000 at this camp, and has one of the most thoroughly equipped mining camps in Lower California.

## BRITISH COLUMBIA.

Herewith are the producers, together with the amounts of ore in pounds each sent forth over the Kaslo & Slocan Railway during the year:

	Pounds
Payne.....	13,614,000
Ruth.....	8,359,000
Whitewater.....	6,073,000
Last Chance.....	3,278,000
Slocan Star.....	2,745,000
Lucky Jim.....	2,160,000
Montezuma.....	977,600
Rambler-Cariboo.....	936,900
Antoine.....	750,050
Queen Bess.....	310,000
Dardanelles.....	258,000
Jackson Mines.....	194,000
Bismarck.....	146,250
Silver Bell.....	123,500
Blue Bird.....	90,000
Sovereign.....	80,000
Whitewater Deep.....	78,000
Miller Creek.....	70,000
Charleston.....	62,000
Black Diamond.....	60,000
Native Silver Bell.....	60,000
Goodenough.....	40,000
Treasure Vault.....	40,000
Wonderful Bird.....	33,465
Fidelity.....	30,000
Stevenson Concentrator.....	30,000
Great Western.....	30,000
Two Friends.....	24,000
Ruby Silver.....	24,000
N. C. Exploration.....	22,000
Carbonate No. 2.....	15,800
Fourth of July.....	7,000
C. M. Wilson.....	5,415
Fountain.....	1,125
Fletcher Mine.....	1,000

Total pounds.....42,303,115

—The Kootenaiian.

## MEXICO.

Iron is found in such vast quantities in Mexico that practically no effort is made to utilize it, says the Chihuahua *Enterprise*. The Cerro del Mercado, in Durango, is a hill of almost solid mineral, 640 feet in height, 4,800 feet long and 1,100 feet in width; it is

estimated that down to the general level, 300,000,000 tons of solid ore could be taken from this hill. The deposits in Mexico are sufficient to supply the universe for centuries to come.

## KANSAS LEAD AND ZINC.\*

[Continued from our issue of January 15, 1899.]

The most abundant mineral associated with lead and zinc ores is calcite,  $\text{CaCO}_3$ , the carbonate of calcium, often called calc spar, the "tiff" of the miners. This mineral is simply crystallized limestone, and is found in cavities of limestone all over the world, having been produced directly from limestone. In many places it forms beautiful crystals, some of which are from one to two feet in length, and from six to eight inches in diameter. The largest ones thus far observed came from the Gracie Clark diggings, about two miles north of Empire. Elsewhere it has entirely filled the cavities in the rock, be they large or small, and is void of external crystalline form. Always, however, the characteristic cleavage of the mineral is apparent, giving the rhombohedral or diamond-shaped blocks upon breaking. Sometimes it is almost perfectly clear and transparent, the "glass tiff" of the miner; elsewhere some staining matter clouds it and gives it a particular color—light buff, greenish, bluish, or whatever it happens to be.

Calcite is so frequently associated with lead ore and zinc ore that it has generally been looked upon as an indication of the ore wherever found. People throughout the whole country, when digging for lead or zinc ores, like to find quantities of it. In so far as it represents an open condition of the ground it may possibly be that it does signify the probability of a valuable ore being found. Aside from this, however, it is doubtful if there is any relation between the two.

Barite, or heavy spar, the sulphate of barium,  $\text{BaSO}_4$ , sometimes is found associated with both the lead ores and the zinc ores, but never in considerable quantity. Fluor spar, calcium fluoride,  $\text{CaF}_2$ , also has been found in a few places, but never to any considerable extent.

Aside from these no minerals of any consequence have thus far been observed by the writer as occurring in the lead and zinc mining district of southeast Kansas.

## GEOGRAPHY OF LEAD AND ZINC ORES.

The only locality in the state where lead and zinc ores are mined at the present time is in the extreme southeast corner of Cherokee county. Here, from an area scarcely equaling four miles square, the whole of the lead and zinc ores have been mined that have ever been shipped from Kansas. The general character of the country is rugged, narrow valleys skirting each little stream, and hills rising on either side from 100 to 200 feet above the valley.

The western limit of the area is approximately marked by Spring River, although some mining has been done west of this stream. The southern limits of the mines as at present operated may likewise be placed at Shoal Creek, a tributary of Spring River entering from the east. Here also this limit is not an exact one, as some mining has been done beyond. The eastern limit is the state line, valuable mines existing immediately beyond in Missouri. The northern limit as

known at present is the Gracie Clark mines, which lie about two miles north of the Memphis railroad station, Galena.

The geographical limits as above given do not really present an exact idea of the area from which the ore has been obtained. The sixteen square miles, probably, is too large by almost one-half, if exact measurements were made. Many confidently expect that the productive area will be widened with future development, and for every reason, as far as geologic conditions are concerned, this may be expected.

*Lead and Zinc Ores in other Parts of the State.*—No ores of lead or zinc have ever been mined in marketable quantities anywhere in Kansas outside of the Galena district. About thirty years ago considerable excitement was raised regarding lead ores in the vicinity of Pleasanton. Prospecting was carried on for some time, and many people thought valuable deposits of ore existed there. The results have failed to justify such hopes, as nothing has been obtained, not even enough to send a single consignment to the markets.

To the west, in the vicinity of Walnut and Erie, small amounts of zinc ore have been obtained. Only a few years ago many sensational rumors were afloat regarding the discovery of great ore beds near Erie. The writer visited this locality and conversed with a few people who had been interested in the prospecting enterprises, but at that time was unable to meet the superintendent of the company. He was shown a number of samples of ore which were genuine zinc blende, all of which were reported to have been obtained from that immediate locality. During the latter part of 1897, a student of the University brought samples of limestone near Walnut which contained crystals of zinc blende, some of them being nearly an inch in diameter. Professor Bailey is authority for the statement that small quantities of zinc blende have been found in the rocks near Lawrence. It is common knowledge that small quantities of zinc blende are frequently in the coal mining areas of both Kansas and Missouri.

These facts show conclusively that the zinc ores particularly, and the lead ores to a lesser degree, exist in small quantities in many localities outside of the Galena area. No one has ever succeeded, however, in finding more than mere traces of the ore, and no one would be justified in making a prediction regarding the possibilities of a larger output. The general geologic conditions of these areas discourage the hope of profitable mining in any of them.

(To be Continued.)

## PROCESS OF MINTING COINS.\*

BY ALEXANDER B. OUTERBRIDGE.

[Continued from our issue of January 15, 1899.]

*The Refining Process.*—The metal now passes into the hands of the "melter and refiner."

We will suppose that the representative deposit that we have already alluded to contains a small percentage of base metals, such as tin and lead, which tend to make the alloy brittle or "short," rendering it unfit for coin. The first operation to which it is subjected is intended to eliminate these impurities, and is called "toughening." The metal is melted in a crucible and an oxidizing flux (saltpeter) is added to it while fluid, the saltpeter or

\*From the Annual Bulletin on Mineral Resources of Kansas for 1897, by Erasmus Haworth, Professor of Physical Geology and Mineralogy, University of Kansas, Lawrence, Kansas.

\*Abstract of an address before the Stated Meeting of the Franklin Institute, November 24th 1898, and published in the Journal of the Franklin Institute.



niter decomposes and liberates oxygen gas; the oxygen seizes the base metals forming oxides; these rise to the surface and are dissolved in the flux; the flux, when sufficiently thick, is skimmed off, and the purified metal, consisting only of gold and silver, is poured into cold water to form granulations. The next operation is designed to remove the silver; this is effected by boiling in nitric acid, when the silver dissolves, leaving the gold.

The "plant" used for this purpose consists of a number of large porcelain jars capable of holding about 35 gallons each.\*

These are arranged in a double row and heated by steam pipes; they are inclosed in a chamber provided with sliding doors to prevent the escape of the noxious fumes, which are carried into a tall chimney from which they issue in a yellowish cloud. The dissolved silver is drawn off by means of a large siphon made of native California gold (valued at \$3,000) and transferred to a vat made of wood (capacity 2,000 gallons), resembling those used in breweries. The vat contains several hundred gallons of salt water, and the silver is precipitated by the chlorine, a workman facilitating the operation by agitating the liquid with a large paddle with long handle.

The precipitated silver is drawn off into large filters on trucks and thoroughly washed by running water until the test of litmus paper shows that all trace of acid has been removed. The chloride of silver now resembles pure white cottage cheese. It is transferred to another vat lined with lead.

\* The charge for each jar is usually 100 pounds of granulations and 175 pounds strong nitric acid.

Zinc (which has been previously granulated by pouring while melted into cold water) is added to the silver, together with a little sulphuric acid; the chlorine deserts the silver for the baser metal, forming a soluble salt of zinc. The solution is allowed to flow off, and the precipitated silver, after having been thoroughly washed, is pressed into round cakes called "cheeses," dried in an oven and melted in the furnace; it is finally cast into a bar, and is found to be uncontaminated with its former base associates, being 998 to 999 fine.

After thoroughly washing, to remove the silver nitrate, the gold sediment is placed in cast-iron pots and boiled in strong sulphuric acid with a little niter added; it is then washed, dried, pressed into cakes and melted. The bars are nearly pure gold, about 999 fine.

All that now remains for the melter and refiner to do is to weigh out the requisite amount of copper to form the coin standard, which is nine parts of gold or silver (as the case may be) and 1 part base metal. In other words, our coin standard is nine-tenths fine.

The alloy is melted in large crucibles made of plumbago, holding over 6,000 ounces, and constantly stirred to render the mass homogeneous. The standard metal is cast into flat bars called ingots, 12 inches long,  $\frac{3}{4}$  inch thick and from  $\frac{3}{4}$  to 1  $\frac{1}{4}$  inches wide; the ingots are filed to remove the ragged edges, and the rough tops cut off with large steam shears. Two samples from each melt are assayed, and if the ingots are found to be of the proper fineness and of uniform composition, they are delivered to the coiner.

(To be Continued.)

## PERSONAL NEWS ITEMS

W. H. ROUTLEDGE, superintendent Summit Consolidated Gold Mining Co., of Orno Ranch, Eldorado County, Cal., was one of the callers at the JOURNAL office the middle of January. Mr. Routledge reports everything moving along nicely now in Eldorado county, with plenty of water and a resumption of milling all over the county.

JAMES M. PIERSON, well known in Los Angeles County, has just returned to Los Angeles, Cal., from an extended trip in the northern part of the state.

M. J. MARTINEZ, member of the American Society of Mechanical Engineers, has received the appointment of resident agent at Havana, Cuba, for the Snow Steam Pump Works. The business will be conducted under the style of M. J. Martinez, consulting and contracting engineer. Mr. Martinez will be prepared to furnish pumps of the most modern designs, made by the Snow Steam Pump Works, especially adapted for the requirements of the various industries of Cuba and Porto Rico.

F. M. CLARK, JACK DUNN, MAT WHELEN, TONY HOCKEY, OTTO STAVENS, GEO. DEATY, and GEO. LANE, all of the Iron Chief mine, in the Eagle Mountains of Riverside county, Calif., were in San Bernardino Calif., last week.

OLAF ELLISON, special representative to the Pacific Coast of the United States Commission to the Paris Exposition of 1900, is making a visit to Southern California, and will look over Arizona before returning north.

We desire to know the present address of Wm. ORR, assayer and chemist. If any of our readers can give it, they will confer a favor.

P. A. HANSON, general manager of the Squaw Creek mine, South Dakota, arrived in Deadwood, from Minneapols.



Represented in Salt Lake City by  
THE UTAH RUBBER & MFG. CO.

## BELTS IN A PLANT ARE LIKE VEINS IN A HUMAN BODY TRANSMITTING POWER, MOTION, LIFE BOTH MUST BE KEPT IN ORDER

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Buy in Any Quantities—Pay good prices—Cash

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132 Greenwich Street, New York City



## THE MARKETS.

All quotations, financial reports and other statistical figures given under this head are New York Quotations, unless otherwise stated in each item. These figures are carefully revised each issue, and constitute a very accurate compilation of statistical matter.

New York Jan. 30th, 1899.  
The following are the silver, copper, and lead quotations for the last two weeks:

	SILVER.	COPPER.	LEAD.
Jan. 18	59 1/2	13 25	4 10
19	59 1/2	13 25	4 10
20	59 1/2	13 25	4 10
21	59 1/2	13 25	4 10
22	59 1/2	13 25	4 10
23	59 1/2	13 25	4 10
24	59 1/2	13 25	4 10
25	59 1/2	13 25	4 10
26	59 1/2	13 25	4 10
27	59 1/2	13 25	4 10
28	59 1/2	13 25	4 10
29	59 1/2	13 25	4 10
30	59 1/2	13 25	4 10

**SILVER.**  
The silver market has been quiet, with business done at slightly declining rates. It is to be noted, however, that the rates for spot and future have been converging, so that March silver has commanded a price only a little under metal for prompt shipment.

**COPPER.**  
The unusual demand for copper is causing comment all over the world. The latter part of last month the quotations were \$12.50 while today they have reached the remarkable figure of \$16.25. Buyers held off as long as possible and have utilized the stock on hand and are now forced to buy to supply their needs, thereby causing the market to be bulled, and as a matter of consequence the price has gone up. We quote for Lake, \$16.00 @ \$16.25; electrolytic in cakes, wirebars

and ingots, \$15.75 @ \$15.87 1/2; cathodes \$15.75. With casting copper at \$15.87 1/2 @ \$16.00.

## LEAD.

A steady increase in the demand for lead has raised the price to \$4.35 with a prospect of it going some higher. There have been considerable quantities of lead withheld from the market with the expectation of securing higher prices, and undoubtedly this will be thrown open, which will cause a reaction and fall in price.

We have to quote \$4.27 1/2 @ \$4.35 New York, and \$4.20 @ \$4.25 for St. Louis.

## SPELTER.

The demand continues fairly steady but is no longer as brisk as it was during the few preceding months. There is quite a disposition on the part of sellers to meet the demand, the quotation being 5.05 @ 5.10c at St. Louis and 5.20 @ 5.25c. at New York.

## ANTIMONY.

Antimony continues strong, and we quote Cookson's 93%; Hallett's, U. S. Star and Japanese, 94%.

## NICKEL.

Business still continues on unchanged lines and no alteration in prices can be reported. We quote for New York ton lots 33 1/2c, and 36c per lb and for smaller orders 35 1/2c, and 38c.

## TIN.

Although the London cables reported a serious break at the beginning of the week, prices here have remained fairly steady on account of supplies being rather meagre. We quote the metal at 18.12 1/2 @ 18.25c.

## PLATINUM.

Prices are now quoted at \$15 and \$16 per oz., New York. The London quotations are 59 @ 60 s per oz. Supplies are not large and prices are firm. For chemical ware, best hammered metal. In lots

of 250 grams or more, 56c, per gram; in lots of 100 grams or more, 57c, per gram; less than 100 grams, 58c, per gram. Manufactured platinum will be supplied in same quantities at 2c. less per gram.

## POTASSIUM CYANIDE.

Purified, 98 @ 99 per cent., in cases of 120 lb. at 32c. per lb. in 5, 10, 25 and 50 lb tins at an advance.

## QUICKSILVER.

The New York quotations are unchanged at \$39.50. The London price is also unchanged at 7 lb. 5s. per lb. with 7 lb., 4s. named for second ends.

## POWDER.

**San Francisco:** No. 1, 70 per cent. nitro glycerine per lb. in carload lots, 15 1/4c less than one ton, 17 1/4c No. 1\* 60 per cent., carload lots, 13 1/2c; less than one ton, 15 1/2c. No. 1\*\* 50 percent. carload lots, 11 1/2c less than one ton, 13 1/2c. No. 2, 40 per cent., carload lots, 10c; less than one ton, 12c. No. 2\*, 30 per cent., carload lots, 9 1/2c; less than one ton, 11c. No. 2\*\* 30 percent., carload lots, 9c; less than one ton, 11c. Black blasting powder in carload lots, minimum car, 728 kegs, \$1.50 per keg; less car lots, \$2 per keg.

## COKE.

The trade in coke at St. Louis is reported very quiet—a condition not unusual as the year draws to a close.

## IN CAR LOTS, ST. LOUIS.

Connellsville 60 coke 72-hr. Fry, \$1.85 New River, \$4.00 Pocahontas, 3.00 Crushed, 4.85 Gas works coke, lump, per bushel, .10

## BORAX.

The San Francisco market in Borax is firm with a good demand. The market is quoted as follows:

Refined, in carload lots, in barrels, 7 1/4c  
Refined, in carload lots in sacks, 7 1/4c  
Powdered, in car lots, 7 1/4c  
Concentrated, in car lots, 6 1/4c

## THE MINOR METALS.

Quotations are given below for New York delivery:

**Aluminum.**  
No. 1, 68 per cent. ingots, per lb. No. 2, 60c.  
Rolled sheets, per lb.  
**Aluminum-Nickel.** per lb.  
Blamuth, per lb.  
Phosphorus, per lb.  
Tungsten, per lb.  
Ferro-tungsten, 60 per cent.

Variations in price depend chiefly on the size of the order.

## CHEMICALS.

Deliveries on contract are good. New contracts have been taken, particularly for alkali. Much 1899 business has been done in domestic caustic soda, and as low as \$1.30 f. o. b. works is reported as the contract price.

## CAUSTIC SODA.

Quotations for Caustic soda domestic high test are \$1.40 @ 1.45 per hundred lbs.

## ALKALI.

Domestic, 58 percent., 50c. @ 55c., foreign 55c. @ 60c. from dock as to style of package.

## CARBONATED SODA ASH.

58 per cent., 90c and 95c per 100 lbs basis 48 per cent.

## BI-CARBONATE OF SODA.

English, \$2.12 1/2 @ \$2.25 per 100 lb. American, bulk \$1.25 and \$1.50 per 100 lbs. according to brand.

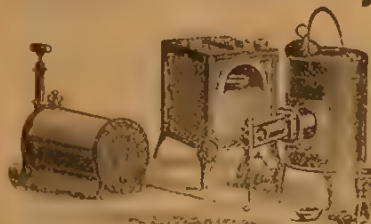
## SAL-SODA.

For domestic, 50c. per 100 lb., less usual discounts; English, 65c. @ 67 1/2c., Concentrated sal-soda, \$1.60 @ \$1.65 per 100 lbs.

## CHLORATE OF POTASH.

Chlorate of potash is quoted at \$9.50 and \$9.75 per 100 lbs.

## Hoskins' Patent Hydro-Carbon



## Blow-Pipe and Assay Furnaces

No dust. No ashes. Cheap, effective, economical, portable and automatic. Send for Price-list to

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## CHLORIDE OF LIME.

English prime brands \$1.60@\$1.70.  
American, \$1.70@\$1.80, Continental P.,  
\$1.60@\$1.60 per 100 lbs.

## Acids.

Spot business is only fair, while for next year's delivery a few more contracts have been booked. Oxalic acid has been reduced by the syndicate to 64c.; thus the jobbers who have bought heavily at 64c. are now in a predicament.

Quotations are per 100 lb from New York and vicinity as follows: Acetic acid, commercial, No. 8, \$1.40@\$1.50; muriatic acid, 18°, \$1.10@\$1.15; 20°, \$1.20@\$1.25; 22°, \$1.35@\$1.40, according to quantity and brand. Nitric acid 36°, \$3.50@\$4.75; 38°, \$3.75@\$4.02; 40°, \$4.00@\$4.87; 42°, \$4.62@\$5.25. Oxalic acid, \$6.50@\$6.75. Mixed acids according to mixture. Sulphuric acid, 66°, \$1.10 for drums and \$1.15@\$1.75 for carboys. Chamber acid 50°, in jobbing way, \$11.50@\$12 per ton f. o. b. factory. Blue vitriol \$3.50@\$3.62½ for extra grades and \$3.37½ for ordinary.

## BRIMSTONE

The market has eased off on the arrival of 2,400 tons, and spot best unmixed seconds can doubtless be had at \$21 per ton, while futures are obtainable at \$19.50@\$20 per ton. Thirds are nominal at \$18.50@\$19. The shipments of brimstone from Sicily to the United States in November, were 7,300 tons.

## NITRATE OF SODA

Buyers and sellers of nitrate of soda are still to far apart to come to any large sales, though about 5,000 bags were sold recently at \$1.52½ per 100 lbs. Sellers are quoting up to \$1.55 for spot, and for futures extending through December, 1899, \$1.55 to \$1.57½ per 100 lbs.

## FINANCIAL NOTES.

## Average Prices of Metals

in New York per pound from January 1, 1898

Month	Copper	Tin	Lead	Spelter
January	10.99	13.87	3.65	3.96
February	11.38	14.08	3.71	4.04
March	11.95	14.38	3.72	4.27
April	12.14	14.60	3.83	4.26
May	12.00	14.52	3.84	4.27
June	11.80	15.22	3.83	4.27
July	11.63	15.60	3.93	4.66
August	11.85	16.23	4.00	4.58
September	12.39	16.03	3.99	4.67
October	12.41	17.43	3.78	4.27
November	12.86	18.20	3.70	5.39

## Average Monthly Prices of Silver.

In New York per ounce Troy, from January 1st, 1898, and for the years 1897 and 1896

Month	1898	1897	1896
January	50.77	64.79	72.1
February	50.07	64.67	72.1
March	51.90	64.06	72.0
April	50.02	61.85	72.0
May	50.98	60.12	72.0
June	50.61	60.10	72.0
July	50.06	59.61	72.0
August	50.54	59.10	72.1
September	50.68	58.24	72.0
October	50.42	57.57	72.0
November	50.00	57.91	72.0
December	50.00	58.01	72.1

The statement of the United States Treasury, on Thursday, Dec. 8th, shows balances in excess of outstanding certificates as below, comparison being made with the statement for the corresponding date last week:

	Dec 1	Changes
Gold	\$44,082,719	1 \$2,250,276
Silver	6,842,551	1 10,711
Legal Tender	14,753,131	1 212,711
Treasury Notes, etc.	1,571,000	1 154,000

Totals \$56,681,401. Treasury deposits with national banks amounted to \$96,380,061, an increase of \$1,744,060 during this week.

Gold and Silver Exports and Imports. At all United States ports, October 1898, and year from January 1st, 1898 and 1897:

	1897	1898
Gold Exports	\$1,942,014	\$1,942,014
Gold Imports	\$2,386,318	\$2,386,318
Gold Balance	\$4,612,574	\$4,612,574
Silver Exports	\$47,812,114	\$47,812,114
Silver Imports	\$7,164,680	\$7,164,680
Silver Balance	\$40,647,434	\$40,647,434

This statement includes the exports and imports at all United States ports, the figures being furnished by the Bureau of Statistics of the Treasury Department.

## WANTS

Advertisements of this class containing not more than five lines will be inserted for not exceeding three months in any year, free of charge, to all paid-up annual subscribers. Other than above \$1.00 per month. Advertisements not accepted for less than one month.

WANTED POSITION of Assayer with Mining Company. Have had experience in Milling and Cyanide works besides technical chemical training. References given. Refractory ores treated by Bromo-Cyanide method. Address, Tye JOURNAL Office.

WANTED, by a young man, a position as Assayer, etc.; experienced, competent and has a good knowledge of all metallurgical operations. Good references. Address, T. K. JOURNAL OFFICE.

EXPERIENCED Assayer and Cyanide operator desires engagement. The successful and economical treatment of silty ore or tailings by cyanide a specialty. ADDRESS W. V. WATSON, Elv. White Pine Co., Nev.

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MINING MAN of experience will develop Gold property of merit for ¼ interest, or will hand whole mine and develop. Correspondence with owners only. Give full particulars. Will give satisfactory references. Address P. O. Box 897, Los Angeles, Cal.

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1-STAMP, 600 lbs. with plates, feeders, etc. on cars free, 400, complete guaranteed. Fine and boiler, new, 125, also stamp 1 1/2 ton. 2-stamp Fulton Engine Works, and 10-stamp Mill with concentration and power cheap; condition guaranteed, also 2-stamp mill complete. PARSONS & HAWKIN, Los Angeles.

A COMPLETE 20-stamp mill and equipment including assay office outfit, see ad page 24. Address B. K. 334, LOMBARD, N. M.

PERMAN Two Stamp Steam Mill at Tucson, Arizona. 15-H. P. Boiler Pump and every thing complete, set up ready for work. In excellent condition, used less than six months. Address DRUMMOND MINING MACHINERY CO., Kansas City, Mo.

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A 60-TON copper smelting plant, consisting of two 30-ton furnaces, one of which has new, seamless liner. Plant is complete in every detail. Also an 8-ton Silver Lead Furnace, entirely new, never having been set up. All of the above located immediately adjacent to railroad. Inquire of GARDNER, WORTHEN & Goss, dealers in Mining and Mill Supplies, Tucson, A. T.

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One 300-H. P. Fraser & Chalmers Corless Engine Cylinder, 24"x18", sectional fly-wheel, 20"x37". Engine in fine condition. Price \$1,500.

Forty-stamp Mill, 850 lbs. rapid drop, together with timbers, bolts, rods, &c.; also building if wanted. Tuloc automatic ore feeders, screens, jigs (Hends), Frue Vanner tables, &c., fine condition and very cheap. Write or come and see us.

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## MINING STOCK QUOTATIONS

BOSTON		
Aetna Con	4 00	Franklin
Altonet	5 12	Gold Coin
Arcadian	20 30	Humboldt
Arnold	12 75	Kovale Con
Ash Hed	2 25	Lake Sup Iron
Battle	22 50	Napa
Battle	28 00	New Idria Ma
Bonanza	12 00	Old Dominion
Boston & C	32 00	Ossola
Boston & Mont	240 00	Parrott
Breece	—	Pioneer
Bulle & Boston	68 50	Quincy
Calmet & Hecla	10 00	San Yacbel
Catalpa	25 00	Tamarack
Centennial	28 00	Peumseh
Crescent	18 00	Victor
Dominion Coal	33 00	Washington Ming
Dominion Prof	118 00	Wolverine
ROSSLAND, BRITISH COLUMBIA		
Alecia	10 00	Le Roi
Big Three	15 00	Lilly Bay
Buite	04 00	Mayflower
Caledonia Con	05 00	Montia
Colonia	28 00	Monte Christo
Commander	12 00	Morning Star
Deer Park	18 00	Mugwump
Enterprise	18 00	Next Egg
Kureka Con	05 00	Northern Belle
Kvening Star	05 00	Novelly
Georgia	02 00	Palo Alto
Garitide	12 00	Phenix
Good Hope	02 00	Red Mount
Grand Prize	08 00	Ross'd H'met'ke
Great Western	03 00	Rossland, Red Mt.
Hattie Brown	03 00	Silverbell
High Ore	02 00	Silver Bell
Iron Mask	78 00	St. Elmo
Iron Colt	10 00	Virginia
I. X. L.	30 00	War Eagle Con
Joule	45 00	West Le Roi
Joule Mac	47 00	White Bear
Jumbo	47 00	White Bear
SAN FRANCISCO		
Alta Con	12 00	Mexican
Andes	18 00	Occidental
Belcher	21 00	Ophir
Best & Belcher	16 00	Overman
Bullion	10 00	Ontario
Caledonia	52 00	Plymouth
Challenge	10 00	Potosi
Chollar	10 00	Quicksilver
Confidence	40 00	Quicksilver pr'd
Con. Cal & V.	83 00	Savage
COLORADO SPRINGS STOCKS		
Crown Point	10 00	Sag. Belcher
Deadwood	45 00	Sierra Nevada
Gold & Curry	18 00	Silver Hill
Hale & Norcross	85 00	Standard
Homesake	60 00	Union Con
Iron Silver	08 00	Utah
Justice	08 00	Yellow Jacket
SALT LAKE CITY		
Alice	75 00	Joe Bowers
Ajax	00 00	Little Pittsburg
Alliance	00 00	Lower Mammoth
Anchor	00 00	Mammoth
Buckeye	00 00	Mercur
Bullion Rock	5 25	Northern Light
Cent. Kureka	38 00	Omnia
Chloride Point	1 38	Ontario
Daly	84 00	Overland
Dalton	01 00	Richmond Ana.
Dalton & Lark	07 00	Conda
Daly	85 00	Racramento
Daly West	4 05	Silver King
Dexter	2 15	Star Consolidated
Esle	08 00	Sunbeam
Kagle & Blue Hill	87 00	Sunshine
Four Aces	46 00	Swansea
Galena	80 00	Tea Swansons
Geyser-Marion	80 00	Tro
Golden Eagle	03 00	Utah
Grand Central	6 00	Valco
Homesake	05 00	West M'n Pl'cer
Horn Silver	1 15	Young America

## NEW YORK

Adams Con	60 00	Jefferson	00 00
Alamo	30 00	Julia Consolid.	01 00
Alice	20 00	King & Pemb	10 00
American Gold	085 00	Lacrosse	14 00
Anaconda Gold	80 00	Lagonda	10 00
Belcher	30 00	Lexville Cons	09 00
Best & Belcher	30 00	Little Chief	17 00
Breece	10 00	Mexican	10 00
Brynawick	13 00	Mollie Gibson	25 00
Caledonia	50 00	Occidental	01 00
Cannon Hall	0025 00	Old Gold	00 00
Chollar	24 00	Onario	0 25
Chrysolite	13 00	Ophir	02 00
Comstock Tunnel	04 00	Pharmacat	00 00
Comstock Rocks	04 00	Pilgrim	00 00
Comstock Script	03 00	Plymouth	10 00
Consolidated Imp	03 00	Potosi	10 00
Con. Cal & Va.	1 40	Quicksilver	1 75
Copper R ch	00 00	Quicksilver pr'd	0 00
Cr. & Cr. Creek	00 00	Rocky Mountain	03 00
Crescent	10 00	Savage	10 00
Crown Point	15 00	Senora	10 00
Cripple Creek Con	10 00	Sierra Nevada	1 15
Deadwood	60 00	Small Hope	1 25
Elkton Cons	96 00	Standard	1 00
Enterprise	35 00	Union Con	22 00
Father de Smel	18 00	Utah Con	10 00
Garfield Cons	13 00	Wadford	10 00
Gold Magnet	00 00	Yellow Jacket	22 00
Golden Piece	2 00		
Gould & Curry	22 00		
Hale & Norcross	1 70		
Homesake	5 00		
Horn Silver	1 15		
Isabella	25 00		
Iron Silver	75 00		
DENVER STOCK REPORT.			
Aetna	001 00	Keystone	04 00
Anchoria Leland	07 00	Little	09 00
Anaconda	57 00	Maton	22 00
Arcadia	01 00	Mollie Gibson	20 00
Argentum Junata	20 00	Mon Anchor	07 00
Banner	—	Mt. Rosa	15 00
Bob Lee	01 00	Old Gold	—
Rikton	08 00	Peoples	01 00
Ri Paso G	07 00	Pilgrim	02 00
Enterprise	04 00	Pine Creek	00 00
Fanny R	21 00	Portland	1 10
Garfield Grouse	—	Prince Albert	01 00
Geo. Washington	002 00	Republic	02 00
Golden Eagle	28 00	Sacramento	03 00
Gold Coin	—	Smuggler	24 00
Gilpin & C Co	—	Specimen	02 00
Gilpin Four	004 00	Tamarack	007 00
Golden Piece	22 00	Union Gold	13 00
Isabella	23 00	Virginia M	02 00

Iron Clad 24 00  
Jack Pot 62 00  
Sheet of Fortune 002 00  
Work 5 00

## MEXICO

Name of Company	State	Price
Alianza	Hidalgo	6
Amistad y Concordia	"	24
Angelitas	Guasajuato	380
Arenas y Anexas	Hidalgo	240
Asturiana y Anexas	Zacatecas	170
Barradon y Cabras	Durango	150
Bartolome de Medina	Hidalgo	150
Cabrera y An	Zacatecas	30
Canflaria de Pinos	"	100
Capitana	Durango	120
Carmona	Hidalgo	400
Castellana y San Ram	Tepe	25
Cerro Colorado	Chihuahua	10
Cinco Senores y An	Guasajuato	100
Concepcion y Anexas	S. Luis Potosi	100
El Oro	Guasajuato	40
Haparanas y An	Mexico	1,300
Guadalupe	Guasajuato	100
Huastla	Santa Ana	100
Las de Borda	Michoacan	40
Las de Maravillas	Hidalgo	100
Pabellon	"	150
Palma	Zacatecas	100
Pavilona de los Com	"	000
Real del Monte	"	0
Refugio y Va	Durango	375
Restauradora	Hidalgo	12
San Francisco	"	025
San Rafael y Anexas	"	080
do. Free Stock	Hidalgo	20
San Rafael del Oro	S. Luis Potosi	050
Sio. Maria de la Paz	Durango	50
Sirena	Hidalgo	200
Sociedad	"	200
Sorpresas	"	40
Trinidad	Guasajuato	27
Tlaxiango	Puebla	200
Union	Hidalgo	100
Zomelhuacan (gold)	Vera Cruz	15
Zona Min de Pozos	Guasajuato	15

Note—The above Mexican stocks are figured on the basis of Mexican silver.

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Complete mill for testing ores on practical scale by all processes to determine the best process adapted to treating any ore submitted. Processes in use investigated to overcome unnecessary losses, etc.

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Krogh 2-Stamp Tripple-Discharge Quartz Mill, of latest improved pattern. Rock Breakers, Ore Feeders, Concentrators, Engines and Rollers, Hoisting Rigs to be operated by Horse, Steam Power or any other motor; Ore Cars and Ore Buckets, Cornish and Jack-head Pumps, Triple-Acting Pumps, Centrifugal Sand and Gravel Pumps, Wooden Tanks and Pumps for the Cyanide Process, Pipe and Gate Valves, Link Chain Elevators for elevating and conveying all kinds of material. Estimates as to cost of machinery and its erection furnished upon application. Write for Catalogue and Prices.

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Stone Channelers,  
The Pohle Air Lift Pump,  
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NEW YORK.

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New Catalogue No. 41

Pamphlet No. 100

Catalogue No. 73

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## The Ingersoll-Sergeant Drill Co.

We bought two years ago at the largest

size of the straight line type of Ingersoll-Sergeant Piston

Inlet Compressor

This was found to be too small for our needs about a year

ago and we purchased of you a Duplex Corliss machine

16 x 18 1/2 x 42"

This was set in place in our shaft house in the Cripple Creek

District, 10,000 feet above the level of the sea, and has been

running continuously ever since and at times over ten (10)

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Independent Jet Condenser for which we are using the mine

water, and the resultant economy of operation is very

noticeable

The operation of this Compressor is as near perfect as

that of any machine we have ever seen, and this type is well

worth the extra cost on account of the great permanent

economy in operation

Our mine is equipped exclusively with your drills and we

have only the highest words of praise to give them.

Yours very truly, The Portland Gold Mining Co.,

Jas A. Burns, President



## The Improved WONDER Irrigation Pump



We also Build Vertical Style for Mining Purposes.  
Write for full particulars and Catalogue.

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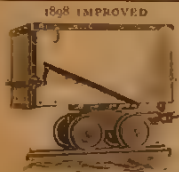
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Arrive St. Rimo, 8 15 p. m.  
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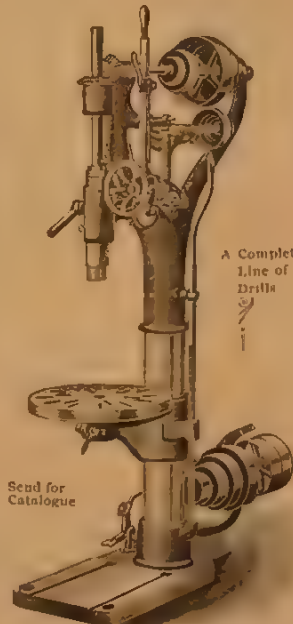
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## INCORPORATED MINES PAYING DIVIDENDS.

NAME OF MINES	LOCATION	No. of Shares	Capital Stock	Par Value	Amount of Last Dividend	Date of Last Dividend	Last Dividend Paid	Remarks
1 Arctic Copper	California	100,000	\$ 500,000	\$ 5	\$ 10	Oct 1898	150,000	G
2 Alaska Teedwell	Alaska	200,000	5,000,000	25	37 1/2	July 1898	3,500,000	G
3 Arctic Mexican	Alaska	200,000	1,000,000	5	10	July 1898	2,000,000	G
4 Arctic	Montana	400,000	10,000,000	25	65	April 1898	1,000,000	G, S, I
5 Arctic	Montana	1,200,000	30,000,000	25	1 25	Nov 1898	8,200,000	G
6 Arctic Island	Colorado	800,000	800,000	1	01	Nov 1898	10,000	G
7 American Gold	Colorado	300,000	3,000,000	10	09	Oct 1898	362,000	G
8 Associated	Colorado	1,250,000	1,250,000	1	01	Nov 1898	50,000	G
9 Atlantic	Michigan	40,000	1,000,000	25	1 00	Feb 1898	780,000	S
10 Atlantic	Michigan	100,000	2,500,000	25	50	May 1898	750,000	I
11 Bald Butte	Montana	250,000	250,000	1	03	Oct 1898	627,138	G, I, S
12 Big Six	Colorado	500,000	500,000	1	00 1/2	May 1898	1,000	G, S
13 Boston & Montana	Montana	150,000	3,750,000	25	5 00	Nov 1898	9,125,000	G, I, S
14 Breese	Colorado	200,000	5,000,000	25	05	Dec 1898	30,000	I
15 Bullion Beck and Champion	Utah	100,000	1,000,000	10	10	Dec 1898	2,500,000	G
16 Bunker Hill and Sullivan	Idaho	300,000	3,000,000	10	07	Nov 1898	570,000	S, I
17 Cariboo	British Col	80,000	800,000	1	02	Aug 1898	236,650	G
18 Calumet & Hecla	Michigan	10,000	2,500,000	25	10 00	Sept 1898	54,860,000	C
19 Centennial Enreka	Utah	30,000	1,500,000	50	50	Dec 1898	2,500,000	S, I
20 Central Lead	Missouri	10,000	1,000,000	100	50	Nov 1898	77,000	I
21 Champion	California	34,000	340,000	10	25	April 1898	296,200	G
22 Charleston	S. Carolina	10,000	1,000,000	100	1 50	Sept 1898	165,000	
23 Chloride Point	Utah	500,000	500,000	1	01	Dec 1897	5,000	G, S
24 Colorado Smelting	Montana	100,000	1,000,000	10	50	July 1898	1,595,000	G, S, C
25 Crowned King	Arizona	600,000	6,000,000	10	02	Oct 1898	208,000	G, S, I
26 Deadwood Terra	S. Dakota	200,000	5,000,000	25	05	May 1898	1,250,000	G
27 De Lamar	Idaho	400,000	2,000,000	5	29	May 1898	2,451,600	S, I
28 Dutch	California	150,000	1,500,000	10	04 1/2	Feb 1898	30,000	G
29 Elkon Consolidated	Colorado	1,250,000	1,250,000	1	01 1/2	Oct 1898	630,961	G, S
30 El Paso	Colorado	650,000	650,000	1	01	Jan 1898	12,000	G, S
31 Empire State	Idaho	75,000	750,000	10	10	Nov 1898	25,000	
32 Enterprise	Colorado	500,000	500,000	1	05	Sept 1898	900,000	S, I
33 Fern	British Col.	200,000	200,000	1	05	Jan 1898	110,000	
34 Geyser Marion	Utah	300,000	1,500,000	5	02	Sept 1898	90,000	G
35 Gold Coin of Victor	Colorado	1,000,000	1,000,000	1	01	Oct 1898	1,000,000	G
36 Golden Cycle	Colorado	200,000	1,000,000	5	02 1/2	Oct 1898	155,000	G
37 Gold Coin	Colorado	200,000	1,000,000	5	05	Nov 1897	160,000	G, S
38 Golden Reward	S. Dakota	1,000,000	1,000,000	15	15	Feb 1898	155,000	G
39 Grand Central	Utah	250,000	250,000	1	12 1/2	Dec 1898	214,750	G, S, C, I
40 Halls Mines Ltd	British Col.	250,000	1,250,000	5	25	May 1898	160,000	
41 Highland	S. Dakota	100,000	10,000,000	100	20	Nov 1898	3,761,718	G
42 Holy Terror	S. Dakota	300,000	300,000	1	03	Sept 1898	117,000	G
43 Homestake	S. Dakota	125,000	12,500,000	100	50	Nov 1898	7,118,750	G
44 Hope	Montana	100,000	1,000,000	10	10	Mar 1898	782,252	S
45 Horn Silver	Utah	400,000	10,000,000	25	05	Sept 1898	5,210,000	S, I
46 Idaho	British Col	500,000	500,000	1	05	May 1898	261,000	
47 Iowa	Colorado	1,000,000	1,000,000	1	00 1/2	June 1898	90,000	G
48 Iron Mountain	Montana	500,000	5,000,000	10	02	Apr 1898	507,500	S
49 Isabella	Colorado	2,250,000	2,250,000	1	00 1/2	June 1897	270,000	G
50 Kearsarge	Michigan	40,000	1,000,000	25	10	Aug 1897	160,000	C
51 Keweenaw	California	100,000	10,000,000	100	48	Aug 1898	1,790,000	S, I
52 Le Roi	British Col	500,000	2,500,000	5	10	Apr 1898	775,000	G
53 Lalla	Colorado	1,000,000	1,000,000	1	01	Oct 1898	146,110	G
54 Minnesota	Minnesota	165,000	16,500,000	100	1 50	Oct 1898	4,735,000	I
55 Modoc	Colorado	500,000	500,000	1	01	Dec 1898	110,000	G
56 Montana Ltd	Montana	800,000	3,300,000	5	05 1/2	May 1898	2,967,557	G, S
57 Montana Ore Purchasing	Montana	40,000	1,000,000	25	1 00	Oct 1898	800,000	
58 Morning Star	California	2,400	240,000	100	5 00	June 1898	666,600	G
59 Mt. Rosa	Colorado	1,000,000	1,000,000	1	02	Jan 1898	60,000	G
60 Mercury	Utah	200,000	5,000,000	25	12 1/2	Nov 1898	1,218,000	G
61 Mammoth	Utah	400,000	10,000,000	25	05	Oct 1898	1,330,000	G, S, C, I
62 Moon Anchor Gold	Colorado	600,000	600,000	1	07 1/2	Nov 1898	281,000	G
63 Mountain Copper	California	250,000	6,250,000	25	62 1/2	Sept 1898	93,750	C
64 New York & Hon. Rosario	Central A.	150,000	1,500,000	10	10	Oct 1898	945,000	S, G
65 Napa	California	100,000	700,000	7	20	Oct 1898	950,000	Q
66 New Idria Quicksilver	California	100,000	500,000	5	20	Sept 1898	80,000	Q
67 North Star	California	200,000	2,000,000	10	25	Nov 1898	500,000	G
68 Ontario	Utah	150,000	15,000,000	100	75	Dec 1897	13,542,500	S, I
69 Oareola	Michigan	50,000	1,250,000	25	2 00	Dec 1898	2,552,000	C
70 Parrot	Montana	230,000	2,300,000	10	30	Oct 1898	2,009,598	C
71 Pennsylvania Consolidated	California	51,500	5,150,000	10	05	Oct 1898	16,500	
72 Pioneer	California	100,000	1,000,000	10	12 1/2	Dec 1898	50,000	G
73 Portland	Colorado	3,000,000	3,000,000	1	02	Nov 1898	2,250,080	G, S
74 Princess	Colorado	1,000,000	1,000,000	1	00 1/2	Feb 1897	47,000	G
75 Quincy	Idaho	100,000	2,500,000	25	3 50	Aug 1898	10,120,000	C
76 Rambler-Cariboo	British Col	1,000,000	1,000,000	1	02	April 1897	40,000	
77 Raven	Colorado	1,500,000	1,500,000	1	01	March 1898	20,000	G
78 Reco	British Col.	1,000,000	1,000,000	1	10	Jan 1898	247,500	S, I
79 Republic	Washington	1,000,000	1,000,000	1	03	Dec 1898	90,000	G
80 Sacramento	Utah	1,000,000	5,000,000	5	00 1/2	Nov 1898	67,000	G
81 Santa Rosalia	California	100,000	100,000	1	10	Feb 1898	125,000	G, S
82 Small Hope Consolidated	Colorado	250,000	5,000,000	20	10	June 1898	3,300,000	S
83 South Swansea	Utah	150,000	150,000	1	05	Oct 1898	125,000	S, I
84 Standard	California	200,000	20,000,000	100	10	Aug 1898	5,671,910	G, S
85 St. Joseph	Missouri	30,000	3,000,000	10	1 50	Sept 1898	2,747,000	I
86 Silver King	Utah	150,000	3,000,000	20	25	Dec 1898	1,800,000	S, I, G
87 Sloan Star	British Col.	2,000,000	1,000,000	0.50	05	Mar 1897	350,000	
88 Smuggler	Colorado	1,000,000	1,000,000	1	01	Oct 1898	1,075,000	S, I, Z
89 Swansea	Utah	100,000	500,000	5	05	Dec 1898	136,500	S, I
90 Tamarack	Michigan	60,000	1,500,000	15	3 00	June 1898	5,331,000	C
91 Victor	Colorado	200,000	1,000,000	5	50	Dec 1898	1,155,000	G
92 Vindicator	Colorado	1,500,000	1,500,000	1	05	Oct 1898	180,500	G
93 Western Mine Enterprise	Montana	500,000	1,500,000	1	20	Jan 1898	48,680	
94 War Eagle	British Col.	2,000,000	2,000,000	1	01 1/2	Oct 1898	239,000	
95 Wolverine	Michigan	80,000	2,500,000	25	1 00	Oct 1898	60,000	C
96 White Water	British Col.	125,000	1,250,000	5	32	April 1898	194,000	
97 Yellow Aster	California	100,000	1,000,000	10	10	Oct 1898	148,789	G

P, Silver. G, Gold. L, Lead.

C, Copper.

Q, Quicksilver.

I, Iron.

Z, Zinc.

N. B.—Companies not listed have not paid a dividend for the last twelve months.



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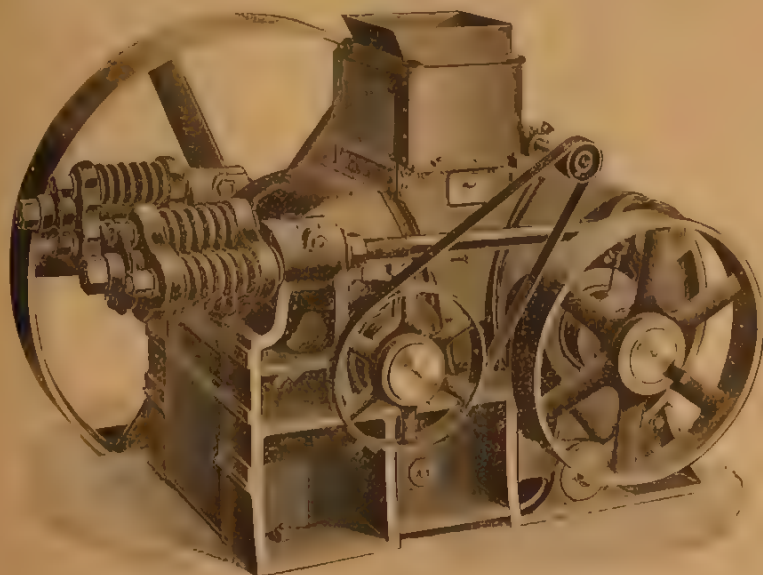


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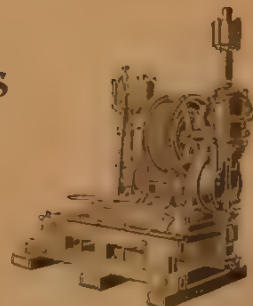
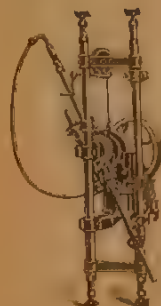
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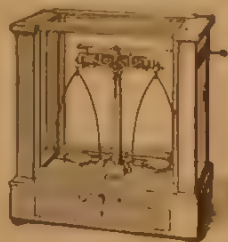
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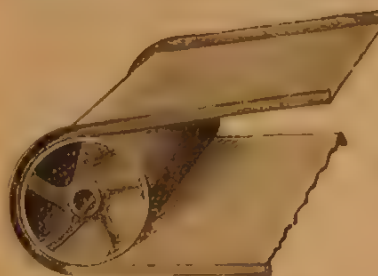


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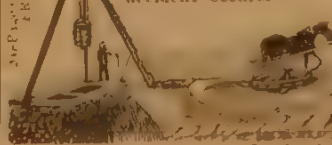
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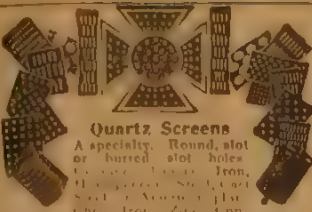
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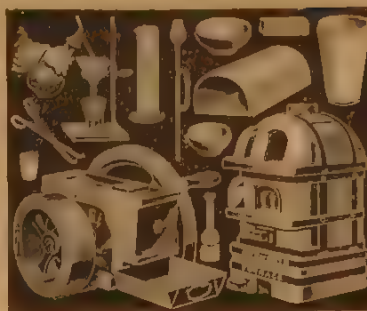
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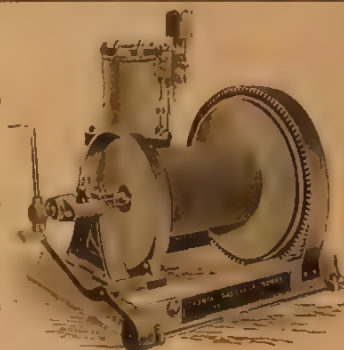
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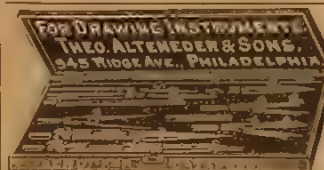


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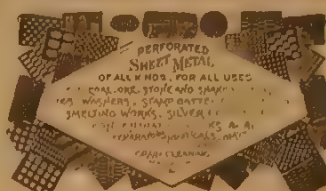
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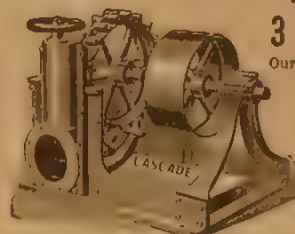
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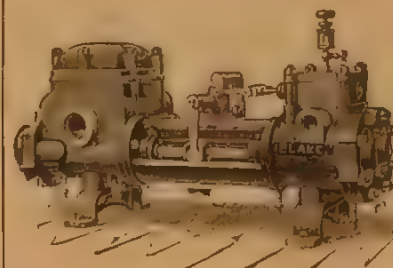
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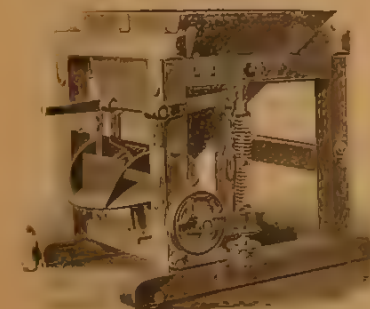
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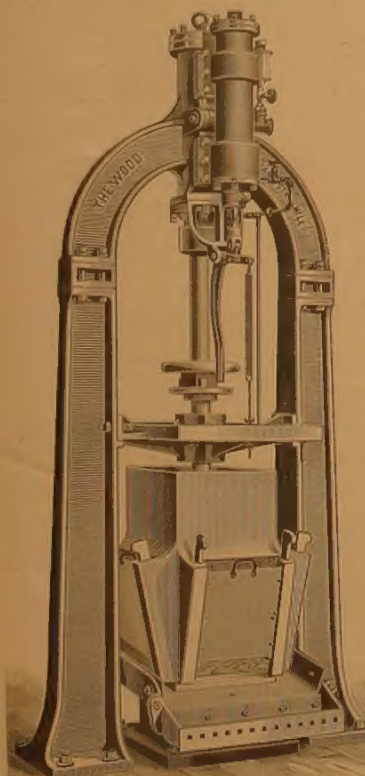
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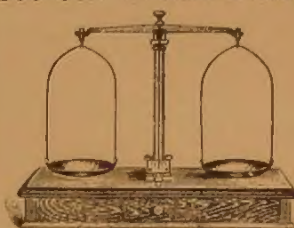
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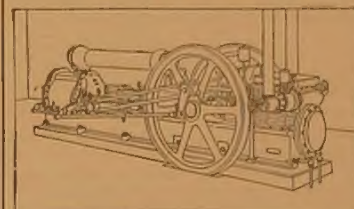
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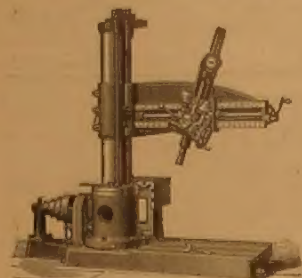
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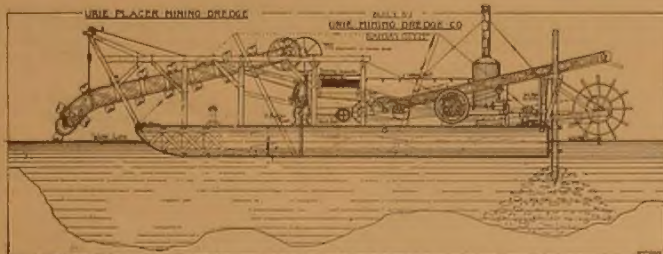
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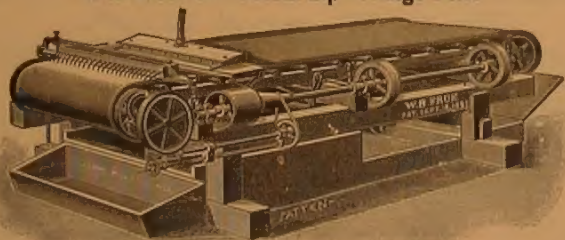
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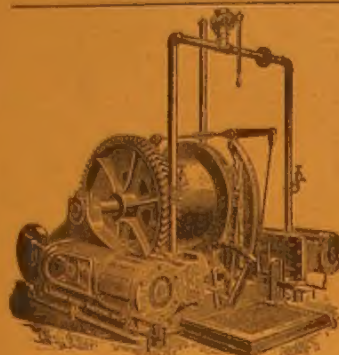
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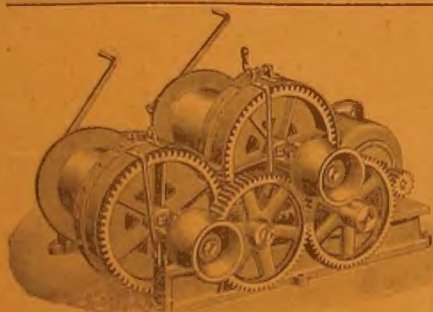
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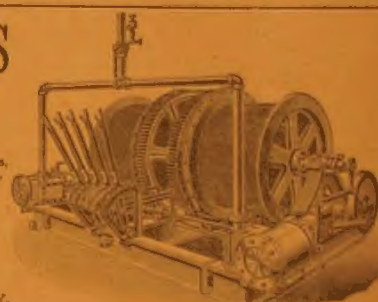
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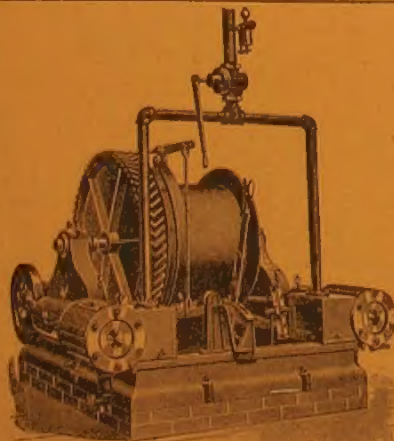
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